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DETAILED DESCRIPTION

[Detailed Description of the Invention]**[0001]**

[Industrial Application] This invention relates to the silver halide photosensitive material containing the new diffusibility-proof color in which there was little emulsion effect of fogging, desensitization, etc., and it was decolorized during quick processing in more detail, and remaining color nature was excellent about the silver halide photosensitive material containing a color.

[0002]

[Description of the Prior Art] Conventionally, making a color contain in the configuration layer of photosensitive material is well known by it, and making a hydrophilic colloid layer dye by the color has been performed to it in order to make silver halide photosensitive material (it is hereafter called photosensitive material for short) absorb the light of specific wavelength for the purpose of a light absorption filter, antihalation, irradiation prevention, or sensibility accommodation of a photosensitive emulsion. The applications, such as a color which dyes the nonphotosensitivity emulsion layer in the dyeing color of the crossover cut layer in the color and X-ray photograph sensitive material of the yellow colloidal silver in color photography sensitive material aiming at an alternative and printing photosensitive material, have spread.

[0003] Having a good absorption spectrum property as a color used for such the purpose according to the purpose of use, of course For example, the thing which it is decolorized completely, elution is easily carried out out of photosensitive material during a development, and the remaining color contamination by the color does not produce after processing, Terms and conditions, such as not excelling and becoming stability with the passage of time into not doing bad influences, such as fogging and desensitization, to a photosensitive emulsion, not being spread from the colored layer to other layers, photosensitive material, or coating liquid, must be satisfied.

[0004] By today, much researches have been done for the purpose of finding out the color with which are satisfied of said terms and conditions. for example, a U.S. Pat. No. 3,540,887 number -- said -- No. 3,544,325 -- said -- No. 3,560,214, JP,31-10578,B, and JP,51-3623,A -- a benzylidene color -- moreover, a merocyanine color is proposed by the U.S. Pat. No. 2,493,747 number, and the styryl color is proposed for the oxo-Norian color by the U.S. Pat. No. 1,845,404 number at British JP,506,385,B and JP,39-22069,B, respectively.

[0005] Its operation exerted on the emulsion engine performance was comparatively small, and in down stream processing, although it had engine performance, such as bleaching and elution, and being decolorized, when some of colors of these former were seen from the point of diffusibility-proof, they were insufficient. That is, when it was made to color alternatively and the specific layer of two or more emulsion layers was used as a filter layer or an antihalation layer, the fault of the light absorption effectiveness not only falling, but the diffusion to other layers having been remarkable and giving the operation which is desirable as for neither a sensibility fall, gradation fluctuation nor the abnormalities in fogging to other layers was seen.

[0006] As a means to prevent the diffusion to the other layers of a color, for example, the U.S. Pat. No.

2,538,008 number which diffusion[-proof]-ized the color itself, said 2,539,009 numbers, said 4,420,555 numbers, JP,61-204630,A, 62-32460, 63-184749, etc. are indicated. Each of these colors was inferior in decolorant or the solubility over processing liquid, therefore it had the fault that remaining color contamination arose. Moreover, for example, a U.S. Pat. No. 2,548,564 number, said 3,625,694 numbers, said 4,124,386 numbers, etc. are indicated as an approach of fixing and diffusion[-proof]-izing a dissociative color using a mordant. However, the gelatin which is a binder in a photosensitive-material configuration layer the approach using a mordant The mordant and the aggregate were formed, or there was a fault which is made to increase viscosity and invites serious failures, such as nonuniformity and HAJIKI, to spreading nature, and moreover, the diffusion-proof between layers also had the fault that the elution nature under processing and decolorant are bad, and needed the processing bath of high pH or it was inferior to quick processing fitness rather than was enough.

[0007] Furthermore, as a means to prevent diffusion of a color, the solid-state particle dispersing element of the color which made it easy to melt with the solution of high pH in water-insoluble nature is used. There is the approach of dyeing a specific layer. For example, a U.S. Pat. No. 4,855,221 number, Said 4,857,446 numbers, said 4,948,717 numbers, JP,52-92716,A, 55-155350, 55-155351, 56-12639, 63-197943, JP,2-110453,A, 2-1838, 2-1839, 2-191942, 2-264247, 2-264936, 2-277044, 4-37841, and world JP,88,B / No. 04794 are indicated. However, although the effectiveness as a means of diffusion[-proof]-izing of a color was seen, this approach had the fault that the color which has a desired absorption spectrum was hard to be obtained, could not be said to be enough [decolorant / in quick processing], but had the problem which still produces remaining color contamination. Therefore, also in quick processing, decolorant is good and a diffusion-proof color which does not have remaining color contamination after processing is desired strongly.

[0008]

[Problem(s) to be Solved by the Invention] About the diffusion[-proof]-ized color, the purpose of this invention agrees in the above-mentioned demand, and fogging is to offer the silver halide photosensitive material with which stability with the passage of time was improved few.

[0009] Another purpose is to offer the silver halide photosensitive material which excelled [high sensitivity] in sharp nature. Moreover, another purpose is to offer the silver halide photosensitive material which gives an image with little remaining color contamination by the short-time development.

[0010]

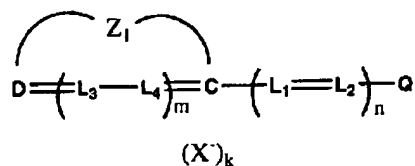
[Means for Solving the Problem] The above-mentioned purpose of this invention was attained by the following configurations.

[0011] 1) Silver halide photosensitive material which has at least one layer of nonphotosensitivity hydrophilic colloid layers containing the solid-state particle dispersing element of the color expressed with the following general formula (1) on a base material.

[0012]

[Formula 6]

一般式 (1)



[0013] D among a formula A nitrogen atom, N+R1 (R1 expresses the alkyl group or alkenyl radical which is not permuted [a hydrogen atom, a permutation, or].), O+ Or express S+ and Z1 expresses a nonmetal atom group required to form heterocycle. Q expresses an aryl group or a heterocycle radical, X- expresses an anion, k expresses 0 or 1, m expresses 0 or 1, n expresses 1, 2, or 3, and L1, L2, L3, and L4 express the methine group which is not permuted [a permutation or]. However, at least one of L1 or the L2 is the methine group by which Hammett's substituent constant sigma_p value was permuted with 0.3 or more electronic suction nature machines.

[0014] 2) Silver halide photosensitive material of said one publication with which the color of a general formula (1) has at least one of a carboxyl group, a sulfamoyl group, a sulfonamide radical, or the phenolic hydroxyl groups in a molecule.

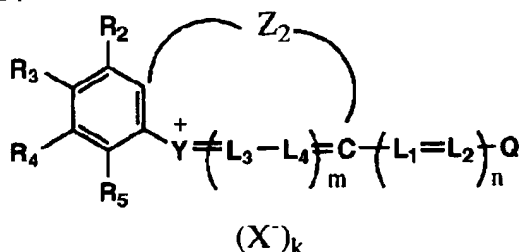
[0015] 3) Silver halide photosensitive material of said 1 or 2 publication which is the electronic suction nature machine with which an electronic suction nature machine is chosen from a cyano group, an acyl group, an alkoxy carbonyl group, an aryloxy carbonyl group, an alkyl sulfonyl group, an aryl sulfonyl group, a trifluoromethyl radical, or a carbamoyl group in a general formula (1).

[0016] 4) Silver halide photosensitive material of said one publication by which the color of a general formula (1) is expressed with the following general formula (2).

[0017]

[Formula 7]

一般式 (2)



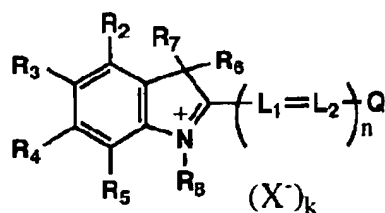
[0018] R2, R3, R4, and R5 express a hydrogen atom or a substituent among a formula, and Z2 expresses a nonmetal atom group required to form the heterocycle of 5 members or 6 members. Y is NR8 (R8 expresses the alkyl group or alkenyl radical which is not permuted [a hydrogen atom, a permutation, or].). An oxygen atom or a sulfur atom is expressed, Q expresses an aryl group or a heterocycle radical, X⁻ expresses an anion, k expresses 0 or 1, m expresses 0 or 1, n expresses 1, 2, or 3, and L1, L2, L3, and L4 express the methine group which is not permuted [a permutation or]. However, at least one of L1 or the L2 expresses the methine group permuted by the radical chosen from a cyano group, an acyl group, an alkoxy carbonyl group, an aryloxy carbonyl group, an alkyl sulfonyl group, an aryl sulfonyl group, a carbamoyl group, or a trifluoromethyl radical, and it has at least one of a carboxyl group, a sulfamoyl group, a sulfonamide radical, or the phenolic hydroxyl groups in a molecule.

[0019] 5) Silver halide photosensitive material of said four publication by which the color of a general formula (2) is expressed with the following general formula (3).

[0020]

[Formula 8]

一般式 (3)



[0021] R2, R3, R4, and R5 express a hydrogen atom or a substituent among a formula, and R6 and R7 express the alkyl group or aryl group which is not permuted [a permutation or]. R6 and R7 may be combined mutually and a ring may be formed. R8 A hydrogen atom, The alkyl group or alkenyl radical which is not permuted [a permutation or] is expressed, Q expresses an aryl group or a heterocycle radical, X⁻ expresses an anion, k expresses 0 or 1, n expresses 1, 2, or 3, and L1 or L2 expresses a permutation or an unsubstituted methine group. However, at least one of L1 or the L2 expresses the methine group permuted by the radical chosen from a cyano group, an acyl group, an alkoxy carbonyl group, an aryloxy carbonyl group, an alkyl sulfonyl group, an aryl sulfonyl group, a carbamoyl group, or

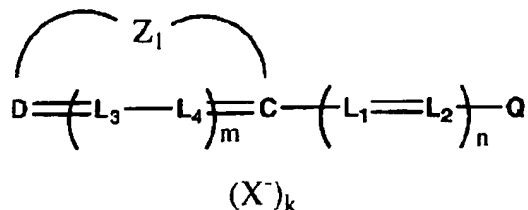
a trifluoromethyl radical, and it has at least one of a carboxyl group, a sulfamoyl group, a sulfonamide radical, or the phenolic hydroxyl groups in a molecule.

[0022] 6) Silver halide photosensitive material which has the silver halide emulsion layer of at least one layer on a base material, and has the hydrophilic colloid layer which contains at least one sort of the solid-state particle dispersing element of a color expressed with the following general formula (1) between this base material and this silver halide emulsion layer in the silver halide photosensitive material containing at least one sort of a hydrazine derivative expressed with the following general formula (4) in this emulsion layer or other hydrophilic colloid layers.

[0023]

[Formula 9]

一般式 (1)



[0024] D among a formula A nitrogen atom, N+R1 (R1 expresses the alkyl group or alkenyl radical which is not permuted [a hydrogen atom, a permutation, or].), O+ Or express S+ and Z1 expresses a nonmetal atom group required to form heterocycle. Q expresses an aryl group or a heterocycle radical, X- expresses an anion, k expresses 0 or 1, m expresses 0 or 1, n expresses 1, 2, and 3, and L1, L2, L3, and L4 express the methine group which is not permuted [a permutation or]. However, at least one of L1 or the L2 expresses the methine group permuted by the radical chosen from a cyano group, an ASHIRURU radical, an alkoxy carbonyl group, an aryloxy carbonyl group, an alkyl sulfonyl group, an aryl sulfonyl group, a trifluoromethyl radical, or a carbamoyl group, and it has at least one of a carboxyl group, a sulfamoyl group, a sulfonamide radical, or the phenolic hydroxyl groups in a molecule.

[0025]

[Formula 10]

一般式 (4)



[0026] A expresses an aliphatic series radical, an aromatic series radical, or a heterocycle radical among a formula, B expresses a hydrogen atom, an alkyl group, an aryl group, an alkoxy group, an aryloxy group, or the amino group, and G expresses a -CO-radical, a -COCO-radical, a -SO₂-radical, a -SO-radical, a thiocarbonyl group, or an imino methylene group.

[0027] 7) The development approach characterized by processing the silver halide photosensitive material of said one publication by all the processing times for 90 or less seconds.

[0028] 8) The development approach characterized by processing the silver halide photosensitive material of said one publication by all the processing times for 45 or less seconds.

[0029] Hereafter, this invention is explained still more concretely.

[0030] The color expressed with said general formula (1) of this invention, (2), or (3) is explained. As a heterocycle radical expressed with Z1 of a general formula (1), a pyridyl radical, a quinolyl radical, an iso quinolyl radical, a pyrrolyl radical, an indolyl radical, a pyrazolyl radical, an imidazolyl radical, a benzimidazolyl radical, a furil radical, a benzofuril radical, a thienyl group, a benzothienyl group, a thiazolyl radical, a bends thiazolyl radical, an oxazolyl radical, a bends oxazolyl radical, an in DORENIRU radical, a benzimidazolyl radical, a bends thio pyrylium radical, etc. are mentioned.

[0031] As a heterocycle radical containing Z2 of a general formula (2), a quinolyl radical, an isoquinolyl radical, an indolyl radical, a benzimidazolyl radical, a benzofuril radical, a benzothienyl group, a bends thiazolyl radical, a bends oxazolyl radical, an in DORENIRU radical, a benzimidazolyl radical,

a bends thio pyrylium radical, etc. are mentioned.

[0032] As an aryl group expressed with Q of a general formula (1), (2), or (3), a phenyl group, a naphthyl group, and a JURORIJIRU radical are mentioned, and a pyridyl radical, a quinolyl radical, an iso quinolyl radical, a pyrrolyl radical, an indolyl radical, a pyrazolyl radical, an imidazolyl radical, a benzimidazolyl radical, a furil radical, a benzofuril radical, a thienyl group, a benzothienyl group, a thiazolyl radical, a benzothiazolyl radical, an oxazolyl radical, a bends oxazolyl radical, etc. be mentioned as a heterocycle radical.

[0033] The aryl group and heterocycle radical which are expressed with Q of the heterocycle radical expressed with Z1 of a general formula (1) and the heterocycle radical containing Z2 of a general formula (2), a general formula (1), (2), or (3) what has a substituent -- containing -- this substituent -- carrying out -- For example, an alkyl group, a cycloalkyl radical, an alkenyl radical, an aryl group, A halogen atom, an alkoxy carbonyl group, an aryloxy carbonyl group, A carboxy group, a cyano group, a hydroxy group, a sulfhydryl group, the amino group, An alkoxy group, an aryloxy group, an acyl group, a carbamoyl group, the acylamino radical, an ureido radical, a sulfonamide radical, a sulfamoyl group, etc. are mentioned, and two or more sorts of these substituents may be combined, and you may have them. as a desirable substituent -- the alkyl group (for example, a methyl group --) of carbon numbers 1-8 An ethyl group, t-butyl, n-octyl radical, 2-hydroxyethyl radical, a hydroxy group and cyano groups, such as 2-methoxy ethyl group, and a halogen atom (for example, a fluorine atom --) the alkoxy group (for example, a methoxy group and an ethoxy radical --) of the carbon numbers 1-6, such as a chlorine atom A 2-hydroxy ethoxy radical, a methylene dioxy radical, an n-butoxy radical, etc., the permutation amino group (for example, a dimethylamino radical, a diethylamino radical, and the II (n-butyl) amino group --) An N-ethyl-N-hydroxyethylamino radical, an N-ethyl-N-methanesulfon amide ethylamino radical, carboxy groups, such as a morpholino radical, a piperidino radical, and a pyrrolidino radical, and a carbamoyl group (for example, a carbamoyl group --) A methyl carbamoyl group, an ethyl carbamoyl group, a butylcarbamoyl radical, A dimethyl carbamoyl group, a phenylcarbamoyl radical, 4-carboxyphenyl carbamoyl group, etc., an alkoxy carbonyl group (for example, a methoxycarbonyl group and an ethoxycarbonyl radical --) acyl groups (for example, a methyl carbonyl group --), such as a butoxycarbonyl radical and an octyloxy carbonyl group An ethyl carbonyl group, a butyl carbonyl group, a phenyl carbonyl group, sulfonamide radicals (for example, a methanesulfon amide group --), such as 4-ethyl sulfonamide phenyl carbonyl group It is sulfamoyl groups (for example, a sulfamoyl group, a methyl sulfamoyl group, a phenyl sulfamoyl group, etc.), such as a benzenesulfonamide radical, and these substituents may be combined.

[0034] In the methine group which is not permuted [the permutation expressed with L3 and L4 of the methine group which is not permuted / the permutation expressed with a general formula (1), (2), or L1 and L2 of (3), or / and a general formula (1), and (2), or] The radical shown in the top as a substituent on the aryl group expressed with Q of the heterocycle radical expressed with Z1 of said general formula (1) and the heterocycle radical containing Z2 of a general formula (2), a general formula (1), (2), or (3) as this substituent and a heterocycle radical is mentioned.

[0035] The methine group which is not permuted [the permutation expressed with a general formula (1), (2), or L1 and L2 of (3) or] The electronic suction nature machine permutes and at least one is sigmap value (it is indicated by the volume for Toshio Fujita, "the structure-activity relationship of the chemical field special number No. 122 drug", 96 - 103-page (1979) Nankodo, etc.) of a substituent constant Hammett as the electron withdrawing substituent. 0.3 or more radicals -- desirable -- for example, a cyano group and an alkoxy carbonyl group (for example, a methoxycarbonyl group --) An ethoxycarbonyl radical, a butoxycarbonyl radical, an octyloxy carbonyl group, etc., An aryloxy carbonyl group (for example, a phenoxy carbonyl group, a 4-hydroxy phenoxy carbonyl group), a carbamoyl group (for example, a carbamoyl group, a methyl carbamoyl group, and an ethyl carbamoyl group --) A butylcarbamoyl radical, a dimethyl carbamoyl group, a phenylcarbamoyl radical, acyl groups (for example, a methyl carbonyl group --), such as 4-carboxyphenyl carbamoyl group An ethyl carbonyl group, a butyl carbonyl group, a phenyl carbonyl group, alkyl sulfonyl groups (for example, a methyl sulfonyl group --), such as 4-ethyl sulfonamide phenyl carbonyl group Aryl sulfonyl groups (for

example, a phenyl sulfonyl group, 4-chloro sulfonyl group, etc.), such as an ethyl sulfonyl group, a butyl sulfonyl group, and an octyl sulfonyl group, a trifluoromethyl radical, etc. are mentioned.

[0036] D of a general formula (1) A nitrogen atom, N+R1 (R1 expresses the alkyl group or alkenyl radical which is not permuted [a hydrogen atom, a permutation, or].), O+ Or it is chosen out of S+ and Y of a general formula (2) is NR8 (R8 expresses the alkyl group or alkenyl radical which is not permuted [a hydrogen atom, a permutation, or].). It is chosen out of an oxygen atom or a sulfur atom, and here as an alkyl group expressed with R8 of the alkyl group and general formula (2) which are expressed with R1, and (3) The alkyl group of the carbon atomic numbers 1-8 is desirable. For example, a methyl group, an ethyl group, n-propyl group, an isopropyl group, n-octyl radical, 2-methoxy ethyl group, N and N-dimethyl carbamoyl methyl group, 3-carboxy propyl group, 4-sulfo butyl, 3-hydroxypropyl radical, 4-carboxy butyl, etc. are mentioned, as an alkenyl radical, the alkenyl radical of the carbon atomic numbers 1-6 is desirable, and an allyl group, 2-butenyl group, 3-butenyl group, a 3-carboxy-1-propenyl radical, etc. are mentioned.

[0037] R2, R3, R4, and R5 of a general formula (2) and (3) express a hydrogen atom or a substituent, and the radical shown in the top as a substituent on the aryl group expressed with Q of the heterocycle radical expressed with Z1 of said general formula (1) and the heterocycle radical containing Z2 of a general formula (2), a general formula (1), (2), and (3) and a heterocycle radical is mentioned as this substituent.

[0038] R6 and R7 of a general formula (3) express the alkyl group or alkenyl radical which is not permuted [a permutation or], and it may join together mutually, R6 and R7 may form a ring, and the radical expressed with R8 of R1 of said general formula (1), a general formula (2), and (3) is mentioned as this alkyl group and an alkenyl radical. As a ring which R6 and R7 combine mutually and they form, the cyclohexyl ring which is not permuted [a permutation or], the benzene ring, the carbon condensed rings (for example, a naphthalene ring, a tetralin ring, etc.), the complex condensed rings (for example, a quinoline ring, a tetrahydroquinoline ring, a durolysine ring, etc.), etc. are mentioned.

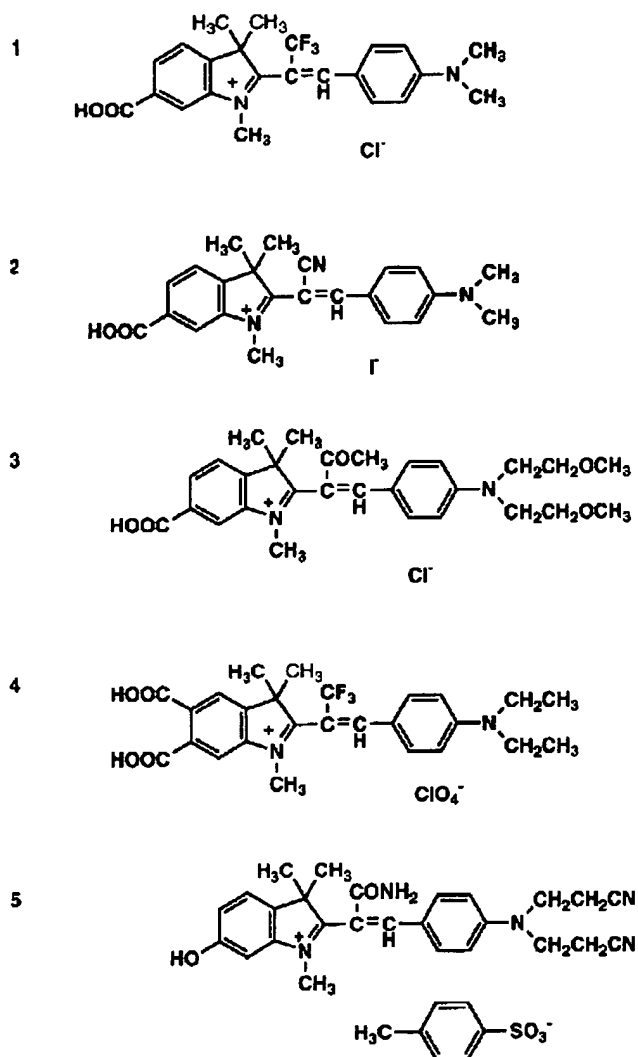
[0039] As an anion expressed with X- of a general formula (1), (2), or (3), halogen ion (Cl-, Br-, I-), ClO4-, p-toluenesulfonic-acid ion, ethyl-sulfuric-acid ion, etc. are mentioned.

[0040] In the color expressed with the general formula (1) of this invention, the color expressed with a general formula (2) is a color expressed with a general formula (3) still more preferably preferably. Moreover, it is the color which has at least one of a carboxyl group, a sulfamoyl group, a sulfonamide radical, or the phenolic hydroxyl groups in a molecule in a general formula (1), (2), or (3) preferably especially.

[0041] Although the example of the color of this invention is shown below, the range of this invention is not restricted to these.

[0042]

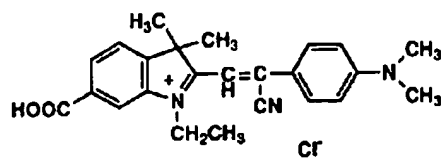
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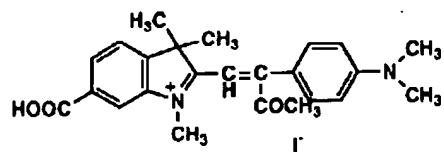
[0043]

[Formula 12]

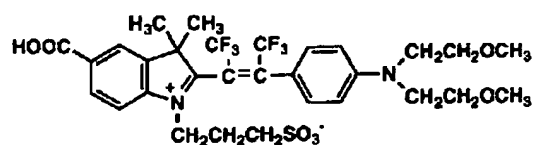
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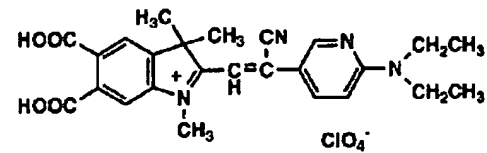
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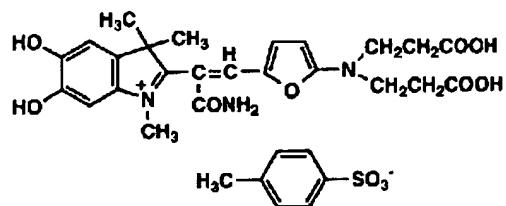
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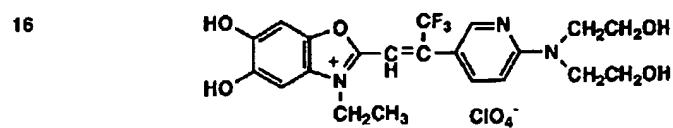
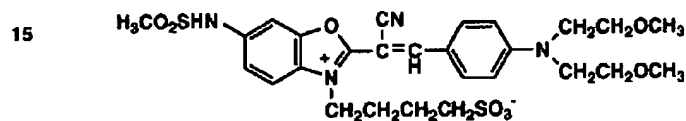
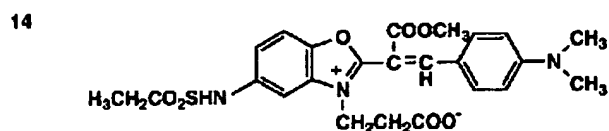
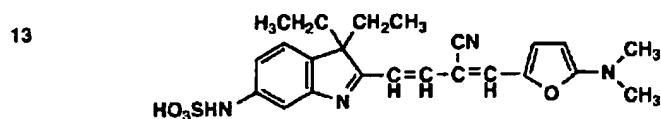
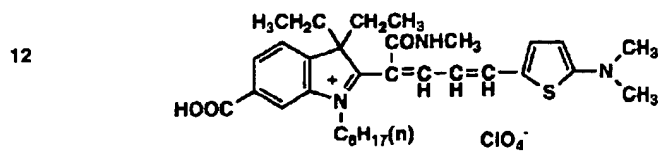
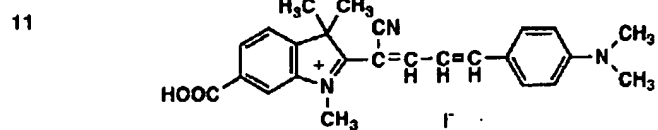


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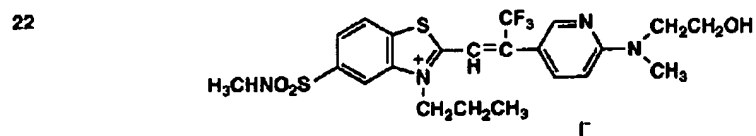
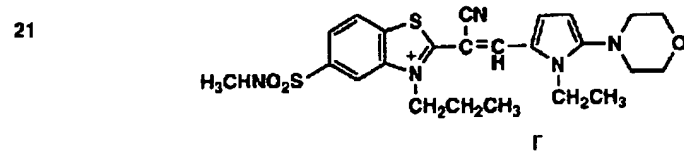
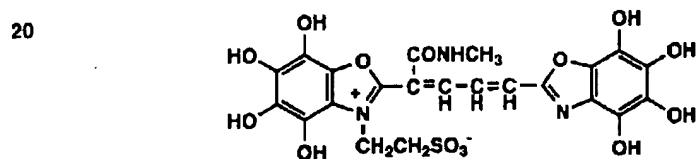
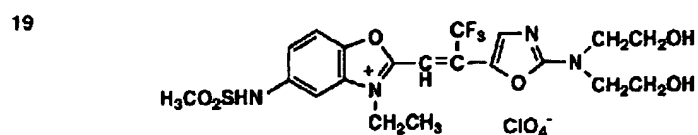
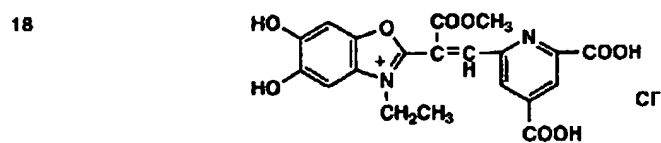
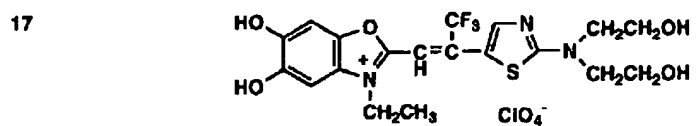
[0044]

[Formula 13]

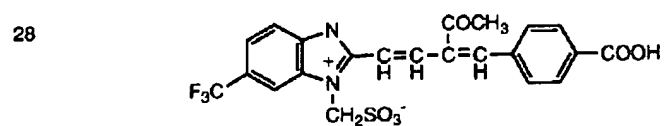
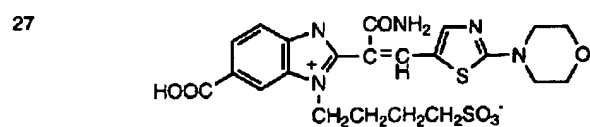
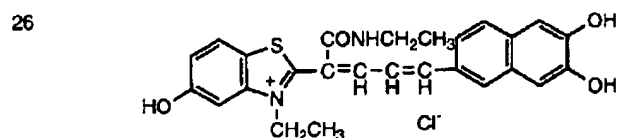
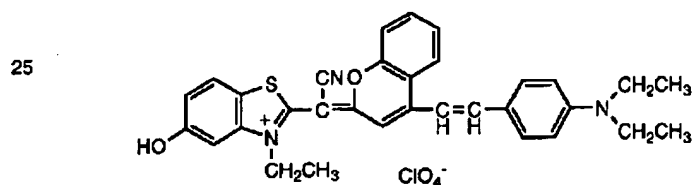
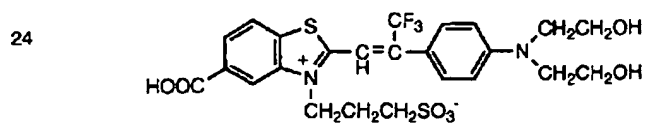
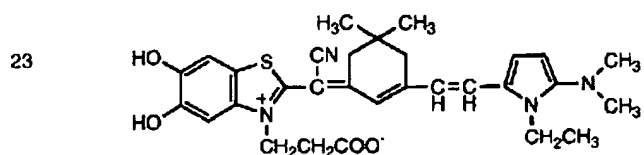


[0045]

[Formula 14]



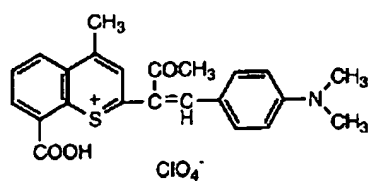
[0046]
[Formula 15]



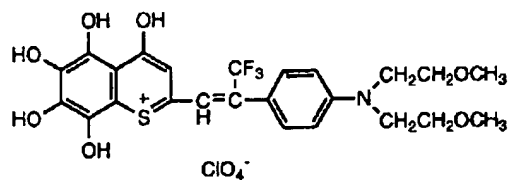
[0047]

[Formula 16]

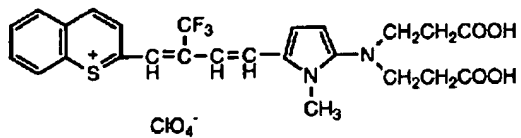
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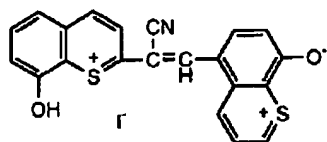
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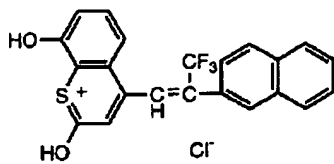
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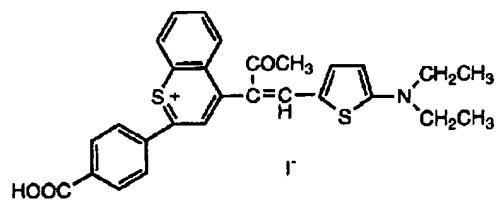
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33



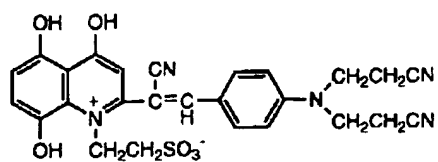
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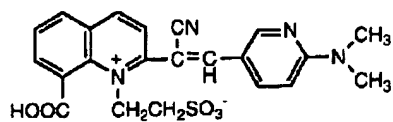
[0048]

[Formula 17]

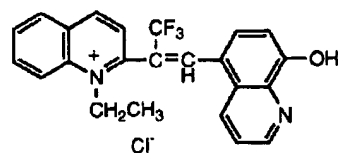
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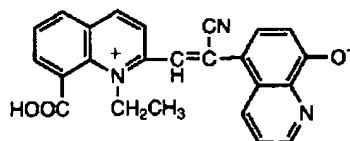
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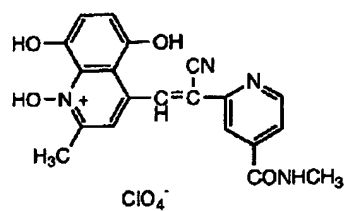
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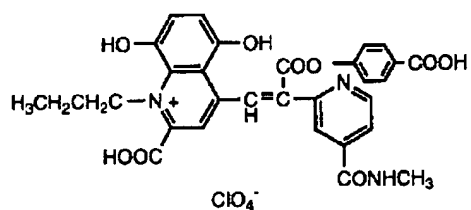
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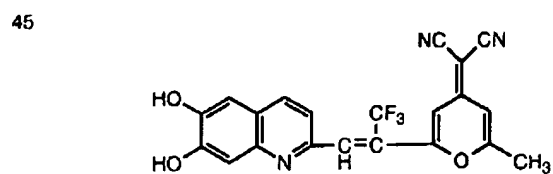
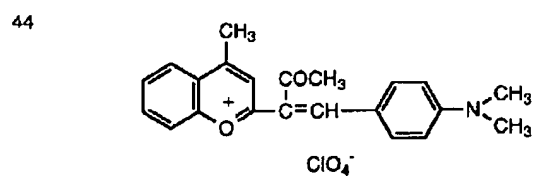
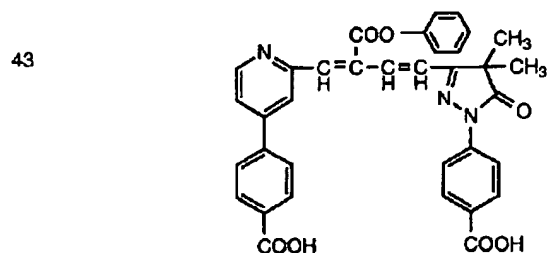
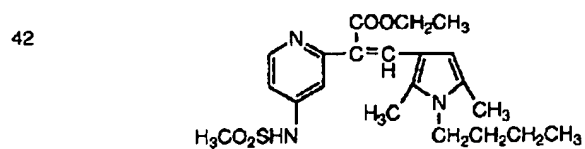
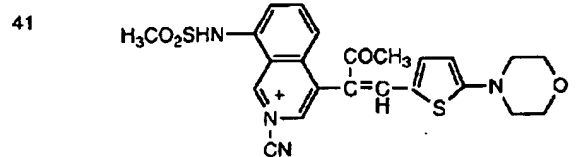


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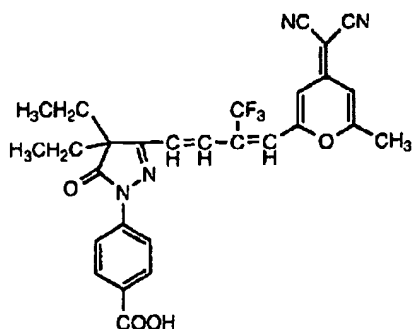
[0049]

[Formula 18]

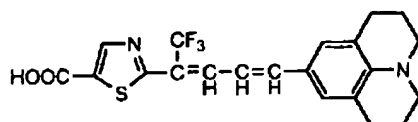


[0050]
[Formula 19]

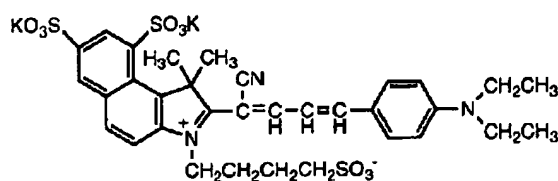
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[0051] Below, the example of concrete composition of the color used for this invention is shown.

[0052] Synthetic example 1 Instantiation color 114-N and N-dimethylamino **** leather aldehyde 1.56g and 2-cyano methyl-6-hydroxy carbonyl-1-methyl -3 and 3-dimethyl in DORIUMU iodide 3.00g were mixed in 10.0ml of acetic anhydrides, and it was made to react under heating reflux for 3 hours. The sludge was carried out the ** exception and it fully washed by ethanol. this rough crystal -- methanol 50ml -- after having put into inside, carrying out suspension washing and carrying out a ** exception, it dried and 3.1g of purple-blue color crystals was obtained. The structure of the obtained color was checked by the NMR spectrum and the mass spectrum.

[0053] As an approach of manufacturing the solid-state particle-like distribution object of the color concerning this invention, the approach indicated by JP,52-92716,A, 55-155350, 55-155351, 63-197943, Taira No. 182743 [three to], the world patent WO 88/No. 04794, etc. can be used. Specifically, it can prepare using micro-disperse machines, such as a ball mill, a vibration mill, a planetary mill, a sand mill, a roller mill, a jet mill, and a disk impeller mill, using a surface active agent. Moreover, after dissolving a color in a weak alkaline water solution, the distributed object of a color can be obtained by the approach which is mixed to coincidence and produces a particle-like solid-state, adjusting pH for the weak alkaline solution and aqueous acids of an approach or a color which deposit a particle-like solid-state by lowering pH and considering as the acescence. A color may be used independently, and may mix and use two or more sorts. When mixing and using two or more sorts, after distributing independently, respectively, you may mix, and it can also distribute to coincidence.

[0054] It is 0.01 micrometers - 1 micrometer to distribute so that mean particle diameter may be set to 0.01 micrometers - 5 micrometers desirable still more preferably, and the color distributed in the shape of [concerning this invention] a solid-state particle is 0.01 micrometers - 0.5 micrometers especially preferably. Moreover, it is the solid-state particle distribution object with which it is 40% or less with which that it is 50% or less desirable still more preferably, and it becomes 30% or less preferably

especially as a coefficient of variation of grain-size distribution. The coefficient of variation of grain-size distribution here is a value expressed with the following formula.

[0055]

(the standard deviation of particle size) / (average of particle size) x100, although a surfactant may be used and an anionic surfactant, a nonionic surface active agent, a cationic surface active agent, or an amphoteric surface active agent can be used as a surfactant, in case the solid-state particle-like distribution object of said color is manufactured Preferably For example, an alkyl sulfonate, alkylbenzene sulfonates, Alkyl naphthalenesulfonate, alkyl-sulfuric-acid ester, and sulfo succinate They are nonionic surface active agents, such as alkyl ester of anionic surfactants, such as sulfoalkyl polyoxy ECHIENARUKIRU phenyl ether and N-reed roux N-alkyl taurines, and a saponin, an alkylene oxide derivative, and sugar.

[0056] Although the location of the arbitration under [before distribution] distribution or after distribution is sufficient as the addition location of a surfactant, it is good to add before distributed initiation of a color preferably. Moreover, depending on the need, you may add to color dispersion liquid further after distributed termination. These anionic activator and/or a nonionic activator may be used independently, respectively, and may combine two or more sorts, respectively, and they may be further used for them combining both activator. Although the amount of an anionic activator and/or the nonionic activator used is not uniform by the class of activator, or the dispersion-liquid conditions of said color, it is good at 0.1-2000mg per 1g of colors, and usually at best still more preferably [it is desirable and] good at 1 to 500mg. [in 0.5-1000mg] As concentration in the dispersion liquid of a color, it is used so that it may become 0.01 - 10 % of the weight, and it is 0.1 - 5 % of the weight preferably.

[0057] The color distribution object of this invention can add the hydrophilic colloid used as a binder of a photograph configuration layer before distributed initiation or after distributed termination. Although it is advantageous as hydrophilic colloid to use gelatin In addition, for example, phenyl carbamylate gelatin, acylation gelatin, Gelatin derivatives, such as FUTARU-ized gelatin, the graft polymer of gelatin and a monomer with the ethylene in which a polymerization is possible, Cellulosics, such as a carboxymethyl cellulose, a hydroxymethyl cellulose, and a cellulose sulfate, Polyvinyl alcohol, the polyvinyl acetate by which partial oxidation was carried out, polyacrylamide, Synthetic hydrophilic-property polymers, such as Polly N,N-dimethylacrylamide, Polly N-vinyl pyrrolidone, and polymethacrylic acid, an agar, gum arabic, an alginic acid, albumin, casein, etc. can be used. Two or more sorts of these may be used combining them.

[0058] The distributed object of the color of this invention can be used for nonphotosensitivity hydrophilic colloid layers, such as a layer, for example, the emulsion layer upper layer, which constitutes photosensitive material, an emulsion layer lower layer, a protective layer, base material undercoat, and a backing layer. The desirable amount of the color used is used so that optical density may be set to 0.05-3.0 according to the purpose into photosensitive material with the class of color, the property of photosensitive material, etc., although it is not uniform, it is 1mg - 1000mg per two 1m of photosensitive material, is 3mg - 500mg still more preferably, and is 5mg - 250mg especially preferably.

[0059] What is necessary is just to contain the solid-state particle distribution object of a color in at least one-layer nonphotosensitivity hydrophilic colloid layer in the photosensitive material of this invention. As hydrophilic colloid, gelatin is desirable, is 0.01 g/m² - 2.0 g/m² preferably as the coverage, is 0.1 g/m² - 1.7 g/m² still more preferably, and is 0.2 g/m² - 1.4 g/m² especially preferably.

[0060] The photosensitive material which has this emulsion layer and this colloid layer, respectively is also preferably used for both sides of a base material that the photosensitive material of this invention should just have at least one-layer a photosensitive silver halide emulsion layer and at least one-layer nonphotosensitivity hydrophilic colloid layer in one field of a base material. As a photosensitive material, the photograph ingredient for medical-application X-rays, the photograph ingredient for printing platemaking, the photograph ingredient for color negatives, the photograph ingredient for color reversal, the photograph ingredient for color printing paper, a direct positive mold photograph

ingredient, the photograph ingredient for heat developing colors, the photograph ingredient for diffusion transfer mold colors, etc. are mentioned.

[0061] Any are sufficient as the gelatin which the gelatin used for the photosensitive material of this invention is generally manufactured considering a cow bone, oxhide, a pig skin, etc. as a raw material, has acid-treatment gelatin accompanied by processing by the alkali treatment gelatin accompanied by processing by lime etc., a hydrochloric acid, etc. in the production process from a collagen, and is used for this invention. About details, such as a process of these gelatin, and a property For example, Arthur Veis work "The Macromolecular Chemistry of Gelatin", 187-217 pages (1964) (Academic Press), T. "The Theory of the photographic Process" 4th.ed written by H.James, 55 pages (1977) (Macmillan), It is indicated by "glue and gelatin" Japan glue gelatin industrial guild issue (1987), 119-"edited one by basic [of photograph engineering]-film photo" 124 page (Corona Publishing), etc. The jelly strength (based on the PAGI method) of gelatin is 250g or more preferably. The calcium content (based on the PAGI method) of the gelatin of this invention is 4000 ppm or less preferably, and is 3000 ppm or less especially preferably.

[0062] Moreover, the dura mater of the gelatin is carried out by the hardening agent, and the amount of hardening agents in photosensitive material can adjust the rate of swelling of the spreading film, and film reinforcement. as a hardening agent -- for example, aldehydes (formaldehyde and glyoxal --) Mucohalogenoacid, such as a glutaraldehyde (mucochloric acid, mucophenoxy KURORU acid, etc.), An epoxy compound, an activity halogenated compound (2, 4-dichloro-6-hydroxy-s-triazine, etc.), an activity vinyl derivative (1, 3, and 5-thoria chestnut roil hexahydro-s-triazine --) bis(vinyl sulfonyl) methyl ether, N, and N'-methylenebis (beta-(vinyl sulfonyl (propione amide) etc.) ethyleneimine --) Organic hardening agents, such as carbodiimides, methansulfonic acid ester, and isoxazoles, inorganic hardening agents, such as chromium alum, and a U.S. Pat. No. 3,057,723 number -- said -- No. 3,396,029 -- said -- the macromolecule hardening agent indicated by No. 4,161,407 etc. can be used, and independent -- or it is combined and used. 150 - 250% of the photosensitive material of this invention has the desirable rate of swelling of the spreading film of a under [a development], and 70 micrometers or less have the desirable thickness after expansion. When the rate of swelling searches for the difference of the thickness of Ushiro who swelled in each processing liquid, and the thickness before a development, and means what it *(ed) by the thickness before processing this, and was doubled 100, the rate of swelling exceeded 250%, poor desiccation is produced and the rate of swelling develops negatives at less than 150%, it is in the inclination for development nonuniformity and a remaining color to deteriorate.

[0063] Although the thing of arbitration, such as a silver bromide, iodine silver bromide, silver iodochloride, silver chlorobromide, salt iodine silver bromide, and a silver chloride, can be used for the halogenation emulsion used for the photosensitive material of this invention, it is especially desirable that they are a silver bromide, iodine silver bromide, silver chlorobromide, and salt iodine silver bromide.

[0064] The silver halide particles in a photographic emulsion may be a thing of a crystal mold like a cube, eight face pieces, and 14 face pieces which grew isotropic altogether or the thing of a many-sided crystal mold like a globular form, the things which consist of twin crystal with a plane defect, those hybrid models, or a compound die. The particle size of these silver halide particle may be a large drop child from a particle 0.1 micrometers or less to 15 micrometers.

[0065] The emulsion used for the photosensitive material of this invention can be manufactured by the well-known approach. for example, research (disclosure RD) No.17643 (December, 1978) and 22-23-page 1; emulsion manufacturing method (Emulsion Preparation and Types) -- and -- said -- it can prepare by the approach of No.18716 (November, 1979) and a 648-page publication. Moreover, T.H.James work The approach of the 4th edition of "The theory of thephotographic process", and 38-104 page [of Macmillan Co. **] (1977) publication, G. "Photographic Emulsion Chemistry" written by F.Dauffin "photographic-emulsion chemistry", Focal Press Co. ** (1966), P. "Chimie et Physique Photographique" written by Glafkides "the physics of a photograph, and chemistry", Paul Montel Co. ** (1967), V. L.Zelikman It is prepared by other work "manufacture [of a photographic emulsion], and

spreading" "Making and Coating Photographic Emulsion", Focal Press Co. ** (1964), etc. by the approach of a publication. That is, it can manufacture using particle preparation conditions and these combination methods, such as mixed conditions, such as order alligation, a back-mixing method, a double jet process, and a controled double jet method, the conversion method, and a core/Shell process, on solution conditions, such as a neutral process, acid process, and the ammonia method.

[0066] As a silver halide emulsion preferably used for this invention, the internal quantity iodine mold monodisperse particle currently indicated by JP,59-177535,A, 61-802238, 61-132943, 63-49751, etc., for example is mentioned. As for the crystal habit of a crystal, a cube, eight face pieces, 14 face piece, and its middle field (111) and middle field (100) may be intermingled in arbitration. When a mono dispersion emulsion here measures mean particle diameter with a conventional method, at least 95% of particle is a silver halide particle of mean particle diameter which has less than **40% to less than **30% preferably by the particle number or weight. The particle size distribution of a silver halide particle may be any of a mono dispersion emulsion with narrow distribution, or the polydispersed emulsion of large distribution. The definition about the mono dispersion nature described here is indicated by JP,60-162244,A, and the coefficient of variation about particle size is 0.2 or less thing. The crystal structure of a silver halide may consist of a silver halide presentation from which the interior and the exterior differed. For example, a core / shell mold mono dispersion emulsion with the two-layer structure which becomes the core part of high iodine from the shell layer of low iodine are mentioned. the process of a mono dispersion emulsion -- well-known -- for example, JP,48-36890,A, 52-16364, 55-142329, 58-49938, 60-14331, and British JP,1,027,146,B -- said -- No. 1,413,748 and a U.S. Pat. No. 3,505,068 number -- said -- No. 3,574,628 -- said -- No. 3,655,394 -- said -- it is indicated by official reports, such as No. 4,444,877.

[0067] Moreover, as a silver halide emulsion preferably used for this invention, three or more plate-like particles are mentioned for an aspect ratio. As an advantage of this plate-like particle, improvement in spectral sensitization effectiveness and amelioration of the graininess of an image or sharp nature are mentioned, for example, it is indicated by British JP,2,112,157,B, a U.S. Pat. No. 4,439,520 number, said 4,433,048 numbers, said 4,414,310 numbers, said 4,434,226 numbers, JP,58-113927,A, 58-127921, 63-138342, 63-284272, 63-305343, etc., and this emulsion can be manufactured by the approach of a publication in these official reports. A mono dispersion emulsion with narrow particle size distribution is used preferably, coefficient of variation is desirable still more desirable, 25% or less of thing is 20% or less of thing, and the plate-like silver halide particle concerning this invention is 15% or less especially preferably. As a plate-like silver halide particle, it is aspect ratios 3.0-8.0 that at least 80% or more of the total projected area of the silver halide particle contained in an emulsion is the aspect ratios 3.0-12.0 shown by (particle size)/(thickness) ratio desirable still more preferably. It is desirable still more desirable that it is 0.05-1 micrometer, and the thickness of a plate-like silver halide particle is 0.05-0.5 micrometers. It is seven or more that the average of the ratio (t/l) of distance (l) also with two or more parallel long ***** between twin planes which a plate-like silver halide particle has, and the thickness (t) of this plate-like particle is five or more desirable still more preferably. The multiplet-structure mold particle shown in the duplex structured type particle which has the silver halide presentation from which the plate-like silver halide particles used preferably are a core / shell mold particle, for example, the interior of a particle and a front face differ, JP,61-245151,A, etc. is mentioned.

[0068] In order to control growth of a particle at the time of formation of a silver halide particle, ammonia, a thioether compound, a thione compound, etc. can be used as a silver halide solvent. Moreover, metal salts, such as zinc, lead, a thallium, iridium, and a rhodium, can be made to live together at the time of physical aging and chemical ripening. Sensitization of the above-mentioned silver halide can be carried out with the noble-metals salt like a sulfur compound metallurgy salt. Moreover, ** which can also carry out [**] reduction sensitization and carries out sensitization combining these approaches is made. Furthermore, the silver halide by which spectral sensitization was carried out to the desired wavelength region using spectral sensitization coloring matter can be used. Cyanine, merocyanine, compound cyanine, compound merocyanine, HOROPORA cyanine, a hemicyanine, styryl coloring matter, hemi oxo-Norian coloring matter, etc. are mentioned to the coloring matter used, and

especially useful coloring matter is cyanine, merocyanine, and coloring matter belonging to compound merocyanine coloring matter.

[0069] ** to carry out is made. The emulsion which distributed the above-mentioned silver halide for example, in gelatin in the hydrophilic colloid medium can be applied to polyethylene terephthalate or a triacetate cellulose base material, and the photosensitive material of this invention can be obtained.

Bridge formation of gelatin can use aldehydes, such as glyoxal and mucochloric acid, cyanuric acid, an aziridine or vinyl sulfones, etc.

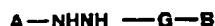
[0070] When applying the photosensitive material of this invention to printing platemaking, the redox compound which emits an amine compound into the hydrophilic colloid layer which adjoins a photosensitive silver halide emulsion layer or it for gradation accommodation, and the hydrophilic colloid layer of further others, and emits a development restrainer by the oxidation reduction reaction as a hydrazine compound or a tetrazolium compound, and a high contrast-ized assistant as a high contrast-ized agent at the time of development can be made to contain.

[0071] As a hydrazine compound, it is the compound which has a -NHNH-radical in a molecule, and the compound expressed with the following general formula (4) is desirable.

[0072]

[Formula 20]

一般式 (4)



[0073] A expresses an aliphatic series radical, an aromatic series radical, or a heterocycle radical among a formula, B expresses a hydrogen atom, an alkyl group, an aryl group, an alkoxy group, an aryloxy group, or the amino group, and G expresses a -CO-radical, a -COCO-radical, a -SO₂-radical, a -SO-radical, a thiocarbonyl group, or an imino methylene group.

[0074] It explains in more detail about a general formula (4). As an aliphatic series radical expressed with A, the alkyl group of carbon numbers 1-30 may be an alkyl group of carbon numbers 1-20 desirable still more preferably, and you may be branching or annular. As an aromatic series radical expressed with A, the aryl group of a monocycle or the condensed ring is desirable, for example, a phenyl group, a naphthyl group, etc. are mentioned. As a heterocycle radical expressed with A, the heterocycle radical containing one hetero atom of a monocycle or the condensed ring chosen from a nitrogen atom, an oxygen atom, and a sulfur atom at least is desirable, for example, a pyridyl radical, a quinolyl radical, an imidazolyl radical, a furil radical, a thienyl group, a thiazolyl radical, a benzothiazolyl radical, a pyrrolidyl radical, a mol HORIRU radical, etc. are mentioned. These aliphatic series radical, an aromatic series radical, or a heterocycle radical may have a substituent. As a substituent For example, an alkyl group, an aryl group, an alkoxy group, an alkylthio group, amino group, An ureido radical, a sulfamoyl group, a carbamoyl group, a sulfonamide radical, The acylamino radical, a hydroxy group, a halogen atom, a cyano group, an acyl group, an alkoxy carbonyl group, a carboxy group, etc. are mentioned. Preferably They are the amino group permuted by the alkyl group of carbon numbers 1-20, the alkoxy group of carbon numbers 1-20, and the alkyl group of carbon numbers 1-20, a sulfonamide radical with the radical of carbon numbers 1-30, and the acylamino radical with the radical of carbon numbers 1-30. They are an aryl group or an aromatic heterocycle radical preferably as A. It is the aryl group or aromatic heterocycle radical on which A has a diffusion-proof radical or a silver halide adsorption promotion radical preferably especially. As a diffusion-proof radical, the ballast radical (for example, the alkyl group from which the sum total of a carbon number becomes ten or more and its derivative, an aryl group, and its derivative) currently used as immobility-ized radicals, such as a coupler for photographs, is desirable, and a thiourea radical, a thio urethane group, a sulfhydryl group, a thioether radical, a thione radical, a mercapto heterocycle radical, a thioamide heterocycle radical, a sulfur-containing heterocycle radical, or an adsorption radical given in JP,64-90439,A is mentioned as a silver halide adsorption promotion radical.

[0075] Especially as G of a general formula (4), a -CO-radical and a -COCO-radical are desirable.

[0076] as the alkyl group expressed with B of a general formula (4) -- the alkyl group (for example, a methyl group --) of carbon numbers 1-8 An ethyl group, an octyl radical, a methoxy ethyl group, 2-hydroxyethyl radical, 3-methanesulfon amide propyl group etc. -- desirable -- as an aryl group -- the aryl group (for example, a phenyl group --) of a monocycle or two rings 3-methanesulfon amide phenyl group, 4-cyanophenyl radical, 4-acetyl phenyl group, a naphthyl group etc. -- desirable -- as an alkoxy group -- the alkoxy group (for example, an ethoxy radical --) of carbon numbers 1-8 a butoxy radical, a 2-methoxyethoxy radical, etc. -- desirable -- as an aryloxy group -- the aryloxy group (for example, a phenoxy group --) of a monocycle or two rings 4-methane sulfonyl phenyl group, 4-cyanophenyl radical, a naphthyloxy radical, etc. are desirable. As an amino group the amino group (for example, a methylamino radical and a dimethylamino radical --) of a mono-permutation or a JI permutation A propylamino radical, an ANIRINO radical, a dimethoxy ethylamino radical, an N-ethyl-N-methane sulfonyl ethylamino radical, 2, 2 and 6, the 6-tetramethyl piperidyl amino group, a morpholino radical, a pyrrolidyl radical, etc. are desirable.

[0077] As a compound of a desirable hydrazine, JP,3-36540,A, JP,6-194774,A, The compound indicated by U.S. Pat. No. 4,269,929 is mentioned. For example, a 1-formyl-2- {[4-(n-butyl ureido) phenyl]} hydrazine, 1-formyl-2- {4-[2-(2, 4-G tert-pentyl phenoxy) butyl amide] phenyl} hydrazine, 1-(2, 2, 6, and 6-tetramethyl-4-piperidyl amino oxalyl)-2- {4-[2-(2, 4-G tert-pentyl phenoxy) butyl amide] phenyl} hydrazine, 1- {4-(2, 2, 6, and 6-tetramethyl piperidyl) amino oxalyl}-2- {4-[2-(2, 4-G tert-pentyl phenoxy) butyl amide] phenyl sulfonamide phenyl} hydrazine, 1- {4-(2, 2, 6, and 6-tetramethyl piperidyl) amino oxalyl}-2- {3-[1-phenyl-1'-p-chlorophenyl methylthio acetamide phenyl] sulfonamide phenyl} hydrazine, 1-formyl-2- {[4-(2-(2-(2-ethoxy) ethoxy) ethoxy) ethyl thioacetamide phenyl] sulfonamide phenyl} hydrazine, 1-(N-pyridinium methyl carbonyl)-2- {[4-(2-(2-(2-ethoxy) ethoxy) ethyl thioacetamide phenyl] sulfonamide phenyl} hydrazine etc. is mentioned.

[0078] Addition of a hydrazine compound can be added after dissolving in alcohols, such as a methanol and ethanol, ethylene glycol, ether, and ketones, and ten - one mol of the addition is ten - two [10-four to] mols preferably from per [10-6] one mol of silver halides. The development of the pH is carried out less than [developing time 30 second] with 10.8 or less developer, and, as for the photosensitive material containing a hydrazine compound, ten or more can be the contrast.

[0079] As a tetrazolium compound, the compound indicated by JP,3-15039,A, for example is mentioned, for example, 2, 3-JI (p-methoxyphenyl)-5-phenyl tetrazolium chloride;2, 3-JI (p-methylphenyl)-5-phenyl tetrazolium chloride, 2 and 3, 5-Tori (p-methylphenyl) tetrazolium chloride, etc. are mentioned.

[0080] As a tetrazolium compound, the compound indicated by JP,3-15039,A, for example is mentioned, for example, 2, 3-JI (p-methoxyphenyl)-5-phenyl tetrazolium chloride;2, 3-JI (p-methylphenyl)-5-phenyl tetrazolium chloride, 2 and 3, 5-Tori (p-methylphenyl) tetrazolium chloride, etc. are mentioned.

[0081] The amine compound as a high contrast-ized assistant contains at least one nitrogen atom. For example, JP,57-120434,A, 57-129435, 57-129436, 60-129746, 56-94347, 60-140340, 60-218642, 60-66248, U.S. Pat. No. 417,498, 3,021,215, 3,046,134, No. 3,523,787, The compound indicated by 3,746,545, 4,013,471, 4,038,075, said 4,072,523 numbers, No. 4,072,526, etc. can be used choosing it suitably.

[0082] A redox compound as a redox radical Hydroquinone and catechols Naphth hydroquinone, aminophenols, pyrazolidone, and hydrazines It has reductones. As a development restrainer 5-nitroindazole, 4-nitroindazole, 1-phenyl tetrazole, 1-(3-sulfophenyl) tetrazole, It is the compound which has 5-nitro bends triazole, 4-nitrobenzo triazole, 5-nitroimidazole, 4-nitroimidazole, etc., for example, the compound indicated by JP,3-249643,A, U.S. Pat. No. 4,269,929, etc. is mentioned. It can dissolve in organic solvents, such as a methanol, ethanol, ethylene glycol, triethylene glycol, propylene glycol, dimethylformamide, dimethyl sulfo oxide, a tetrahydrofuran, ethyl acetate, an acetone, and a methyl ethyl ketone, and addition of a redox compound can be added. Moreover, high-speed impeller distribution, sand mill distribution, ultrasonic distribution, ball mill distribution, etc. can distribute in the shape of a solid-state particle, and what can melt neither into water nor an organic solvent easily can be

added. Ten - one mol of the addition is ten - two [10-four to] mols preferably from per [10-6] one mol of silver halides. As a desirable redox compound, for example 2-(stearyl amide)-5-(1-phenyl tetrazole-5-thio) hydroquinone, 2- (2 and 4-G t-amyl FENO propionic-acid amide-5-(5-nitro triazole-2-IRU) hydroquinone --) 2-dodecyl thio-5-(2-mercapto thio thiadiazole-5-thio) hydroquinone, A 1-(4-nitroindazole-2-IRU-carbonyl)-2-{[4-(n-butyl ureido) phenyl]} hydrazine, 1-(5-nitroindazole-2-IRU-carbonyl)-2-{4-[2-(2, 4-G tert-pentyl phenoxy) butyl amide] phenyl} hydrazine, 1-(4-nitro triazole-2-IRU-carbonyl)-2-{4-[2-(2, 4-G tert pentyl phenoxy) butyl amide] phenyl} hydrazine, 1-(4-nitroimidazole-2-IRU-carbonyl)-2-{4-[2-(2, 4-G tert-pentyl phenoxy) butyl amide] phenyl} sulfonamide phenyl} hydrazine etc. can be mentioned.

[0083] the silver halide photosensitive material of this invention -- the need -- responding -- this industry -- various well-known techniques and an additive can be used. It adds to a photosensitive silver halide emulsion layer. For example, a protective layer, an interlayer, a filter layer, Photograph configuration layers, such as an antihalation layer, a crossover light cut layer, and a backing layer, can be prepared. In these layers A strong color sensitizer, a coupler, a high boiler, a fogging inhibitor, a stabilizer, a development restrainer, A bleaching accelerator, a fixing accelerator, a color mixture inhibitor, a formalin scavenger, a color tone agent, a hardening agent, a surface active agent, a thickener, a plasticizer, a slide agent, an ultraviolet ray absorbent, polymeric latex, an antistatic agent, a mat agent, etc. can be made to contain by various kinds of approaches. The paper which laminated a cellulose triacetate, a cellulose nitrate, polyester like polyethylene terephthalate, polyolefine like polyethylene, polystyrene, a baryta paper, polyethylene, etc. as a base material which can be used for the silver halide photosensitive material of this invention, glass, a metal, etc. can be used. In order that the front face of these base materials may receive adhesion of a spreading layer, undercoat is prepared, or substrate processing is performed if needed [, such as corona discharge and UV irradiation,].

[0084] these additives mentioned above -- more -- detailed -- research disclosure No.17643 (December, 1978) -- said -- No.18716 (November, 1979) -- said -- it is indicated by No.308119 (December, 1989). The class and written part of a compound which are shown in such research disclosure are shown below.

[0085]

An additive RD-17643 RD-18716 RD-308119 A page A classification A page A page Classification Chemical sensitizer 23 648 Upper right 996 Sensitizing dye 23 648-649 996-8 Desensitizing dye 23 998B Color 25-26 649-650 1003 Accelerator 29 XXI 648 Upper right A fogging inhibitor / stabilizer 24649 Upper right 1006-7 Brightening agent 24 998 Hardening agent 26 651 Left 1004-5 Surfactant 26 - 27 XI 650 Right 1005-6 XI Antistatic agent 27 XII 650 Right 1006-7 XIII Plasticizer 27 XII 650 Right 1006 XII Slide agent 27 XII Mat agent 28 XVI 650 Right 1008-9XVI Binder 26 XXII 1009 XXII Base material 28 XVII 1009 In order to carry out the development of the silver halide photosensitive material of XVII this invention For example T. The 291-334 pages of the THE theory OBU THE photographic 4th edition (TheTheoryof the Photographic Process, fourth Edition) processes of H. James work And the 73rd volume (Journal of the American ChemicalSociety) of journal OBU THE American chemical SOSAETI and a developer which is indicated by 3,100 pages (1951) are used effectively. as a developing agent, it is specifically independent about dihydroxybenzene (for example, hydroquinone), 3-pyrazolidone (for example, 1-phenyl-3-pyrazolidone, 1-phenyl-4-methyl-4-hydroxymethyl-3-pyrazolidone, 5, and 5-dimethyl-1-phenyl-3-pyrazolidone), aminophenols (for example, para aminophenol, N-methyl-para aminophenol), 1-phenyl-3-pyrazolines, an ascorbic acid, etc. -- it is -- it can combine and use. The photosensitive material concerning this invention can carry out the development also of the quick processing which could carry out the development by the quick processing which made development time amount from development to desiccation 90 or less seconds, and made development time amount 45 or less seconds. The development also of the quick processing which furthermore made development time amount 30 or less seconds can be carried out. As processing temperature, it is 25-50 degrees C preferably, and is 30-40 degrees C more preferably.

[0086]

[Example] Although the concrete example of this invention is described below, the mode of operation of

this invention is not limited to this.

[0087] an example 1 (preparation of the seed emulsion -1) -- the seed emulsion -1 was prepared as follows.

[0088]

A1 Ossein gelatin 24.2g Water 9657ml Polypropyleneoxy-polyethyleneoxy disuccinate Na salt (10% ethanol water solution) 6.78ml Potassium bromide 10.8g 10% nitric-acid 114ml B1 2.5 Ns Silver-nitrate water solution 2825ml C(s)1 potassium bromide 824g Potassium iodide 23.5g With water D1 1.75N to which 2825ml is made Potassium-bromide water solution using JP,58-58288,B and a mixed agitator given in 58-58289, 1.5 minutes was required for 464.3ml of each of a solution B1 and a solution C1 with coincidence alligation at the solution A1, it added at the following silver potential controlled variable of 35 degrees C, and nucleation was performed.

[0089] After having required the time amount for 60 minutes, having raised the temperature of a solution A1 at 60 degrees C, after stopping addition of a solution B1 and a solution C1, and doubling pH with 5.0 with a potassium hydroxide 3%, the solution B1 and the solution C1 were again added for 42 minutes by the rate of flow of 55.4 ml/min respectively with coincidence alligation. The silver potential between re-coincidence mixing by 60 degrees C [these 35 degrees C to] a temperature up and solutions B1 and C1 (it measures with a complex ion selection electrode by using a saturation silver-silver chloride electrode as a reference electrode) was controlled to be set to +8mv and +16mv using a solution D1, respectively. pH was doubled with 6 with the potassium hydroxide 3% after addition termination, and demineralization and rinsing were performed immediately.

[0090] As for this seed emulsion, the maximum adjoining side ratio consisted of a hexagon-head monotonous particle of 1.0-2.0, and 90% or more of a total projected area of a silver halide particle checked with the electron microscope that the average thickness of a hexagon-head plate particle was 0.06 micrometers, and mean particle diameter (circle diameter conversion) was 0.59 micrometers. Moreover, the coefficient of variation of the distance between twin planes of the coefficient of variation of thickness was 42% 40%.

[0091] (Preparation of emulsion Em-1) Plate-like emulsion Em-1 which has a core / shell mold structure was prepared using the solution indicated below to be the seed emulsion -1.

[0092] A2 Ossein gelatin 11.7g Polypropyleneoxy polyethyleneoxy disuccinate Na salt (10% ethanol water solution) 1.4ml Seed emulsion -1 0.10 mols With water B-2 ossein gelatin to which 550ml is made 5.9g Potassium bromide 6.2g Potassium iodide 0.8g With water 145ml is made. C2 Silver nitrate 10.1g With water 145ml is made. D2 Ossein gelatin 6.1g Potassium bromide 94g With water 304ml is made. E2 Silver nitrate 137g With water In A2 liquid to which 304ml is made and which was violently agitated at 67 degrees C, B-2 liquid and C2 liquid were added in 58 minutes with the double jet process. Next, D2 liquid and E2 liquid were added in 48 minutes with the double jet process in the same liquid. In the meantime, pH was kept at 5.8 and pAg was kept at 8.7 from beginning to end.

[0093] After addition termination, demineralization and precipitation were performed like the seed emulsion -1, and the average silver iodide content % of emulsion of 0.5 mols of pAg8.5 and pH5.85 was obtained at 40 degrees C.

[0094] When the obtained emulsion was observed with the electron microscope, 81% of projected area was [the size of the mean particle diameter of 0.96 micrometers and particle size distribution] the plate-like silver halide particle of the average aspect ratio 4.5 at 19%. Moreover, the average of the distance between twin planes was 0.019 micrometers, and coefficient of variation was 28%.

[0095] next, the solution which melted an adenine, ammonium thiocyanate, chloroauric acid, the mixed water solution of a sodium thiosulfate, and triphenyl phosphine SERENAIDO to the mixed solvent of ethyl acetate and a methanol, and obtained the specified quantity of spectral sensitization coloring matter after addition as a distributed solid-state particle-like object after making an emulsion (Em-1) into 60 degrees C -- adding -- further -- the silver iodide fine grain emulsion was added after 60 minutes, and aging of a total of 2 hours was given. It is 4-hydroxy-6-methyl as a stabilizer at the time of aging termination. - The specified quantity of 1, 3, 3a, and 7-TETORAZA indene (TAI) was added.

[0096] The above-mentioned additive and its addition (per one mol of AgX(s)) are shown below.

[0097]

Spectral sensitization coloring matter (SD-1) 2.0mg Spectral sensitization coloring matter (SD-2) 120mg Adenine 15mg Ammonium thiocyanate 95mg Chloroauric acid 2.5mg Sodium thiosulfate 2.0mg Triphenyl phosphine SERENAIDO 0.4mg 280mg of silver iodide fine grain emulsions 4-hydroxy-6-methyl - 1, 3, 3a, 7-TETORAZA indene (TAI) The solid-state particle-like distribution object of 50mg spectral sensitization coloring matter was prepared [Japanese Patent Application No. / No. 99437 / four to] according to the approach of a publication. That is, it obtained by agitating the specified quantity of spectral sensitization coloring matter over 30 - 120 minutes in 3,500rpm with a high-speed agitator (dissolver) in addition to the water which carried out temperature control to 27 degrees C beforehand.

[0098] In addition, the average iodine content of the outermost surface of the silver halide particle contained in a silver halide emulsion (Em-1) by addition of the above-mentioned silver iodide fine grain emulsion was about four-mol %. Thus, the additive which carries out a postscript to the emulsion which gave sensitization was added, and it considered as emulsion layer coating liquid, and protective layer coating liquid was also prepared to coincidence.

[0099] Next, the copolymer aqueous dispersion liquid diluted and obtained were applied, under-coating processing was performed so that the concentration of the copolymer which consists of a butyl methacrylate 40wt% three-sort monomer glycidyl methacrylate 50wt% and methyl acrylate 10wt% might turn into concentration 0.15 to 10wt(s)% to both sides of the polyethylene terephthalate film base for X-rays (thickness is 175 micrometers) which carried out blue coloring, and the following color layer was painted on base material both sides. Coincidence multistory spreading was carried out and the further above-mentioned emulsion layer coating liquid and protective layer coating liquid were dried so that it might become the following predetermined coverage.

[0100]

The 1st layer (color layer)

A solid-state particle dispersing element color Amount given in Table 1 Gelatin 0.2 g/m² Sodium dodecylbenzenesulfonate 5 mg/m² Compound (I) 5 mg/m² 2, 4-dichloro-6-hydroxy-1,3,5-triazine sodium salt 5 mg/m² Colloidal silica (mean particle diameter of 0.014 micrometers) The solid-state particle distribution object of 10 mg/m² color was produced according to the approach indicated by world JP,88,B / No. 04794. That is, 21.7ml of water and 2.65g of 6.7% solutions of surfactant Triton X-200 (product made from Rohm & Haas) were put into the 60ml screw cap container, 1.0g of colors which carried out disintegration with the mortar was paid to this solution, and zirconium dioxide bead (diameter of 2mm) 40ml was added. After having shut the cap, putting on the ball mill and distributing for four days at a room temperature, 8.0g of gelatin water solutions could be added 12.5%, it mixed, the zirconium dioxide bead was filtered and removed, and the solid-state particle distribution object of a color was obtained.

[0101] The various following additives were added to the emulsion obtained by the 2nd-layer (emulsion layer) above.

[0102]

A compound (G) 0.5 mg/m² 2, 6-bis(hydroxy amino)-4-diethylamino-1,3,5-triazine 5 mg/m² t-butyl catechol 130mg/m² Polyvinyl pyrrolidone (molecular weight 10,000) 35 mg/m² Styrene maleic anhydride copolymer 80 mg/m² Sodium polystyrene sulfonate 80 mg/m² Trimethylol propane 350 mg/m² Diethylene glycol 50 mg/m² Nitrophenyl triphenyl phosphonium chloride 20mg/m² 1, 3-dihydroxybenzene-4-sulfonic-acid ammonium 500mg/m² 2-mercaptobenzimidazole-5-sulfonic-acid sodium 5mg/m² Compound (H) 0.5 mg/m² n-C₄H₉OCH₂CH(OH) CH₂N₂ (CH₂COOH) 350 mg/m² Compound (M) 5 mg/m² Compound (N) 5 mg/m² Colloidal silica (mean particle diameter of 0.014 micrometers) 0.5 g/m² Latex (L) 0.2 g/m² Dextrin (mean molecular weight 1000) It adjusted so that it might become 1.0 g/m² as 0.2 g/m², however gelatin.

[0103]

The 3rd layer (protective layer)

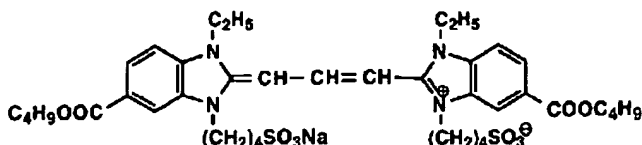
Gelatin 0.8 g/m² 4-hydroxy-6-methyl - 1, 3, 3a, 7-TETORAZA indene 7 mg/m² Mat agent which consists of polymethylmethacrylate 50 mg/m² (area mean particle diameter of 7.0 micrometers)

Formaldehyde 20 mg/m² 2, 4-dichloro-6-hydroxy-1,3,5-triazine sodium salt 10 mg/m² Bis(vinyl sulfonyl methyl) ether 36 mg/m² Latex (L) 0.2 g/m² Polyacrylamide (average molecular weight 10000) 0.1 g/m² Sodium polyacrylate 30mg/m² Polysiloxane (SI) 20 mg/m² compound (I) 12 mg/m² Compound (J) 2 mg/m² Compound (S-1) 7 mg/m² Compound (K) 15 mg/m² Compound (O) 50 mg/m² Compound (S-2) 5 mg/m² C₉F₁₉-O-(CH₂CH₂O)₁₁-H 3 mg/m² C₈F₁₇SO₂N-(C₃H₇) (CH₂CH₂O)₁₅-H 2 mg/m² C₈F₁₇SO₂N-(C₃H₇) (CH₂CH₂O)₄-(CH₂)₄SO₃Na The compound used 1 mg/m² is shown below.

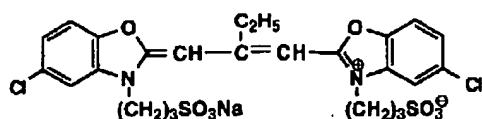
[0104]

[Formula 21]

分光増感色素 (SD-1)



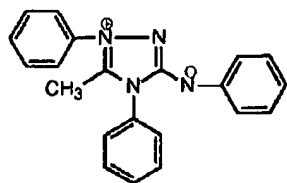
分光増感色素 (SD-2)



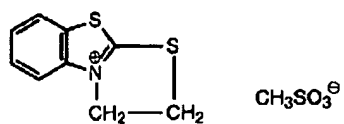
[0105]

[Formula 22]

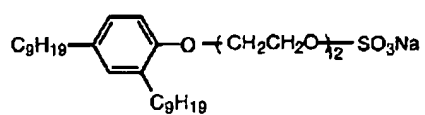
化合物 (G)



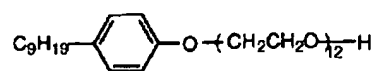
化合物 (H)



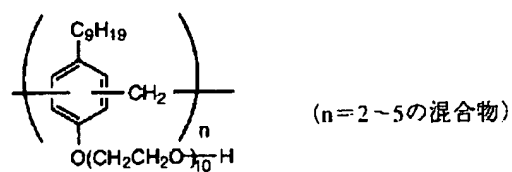
化合物 (I)



化合物 (J)

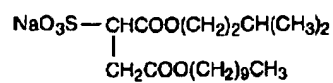


化合物 (K)

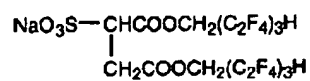


[0106]
[Formula 23]

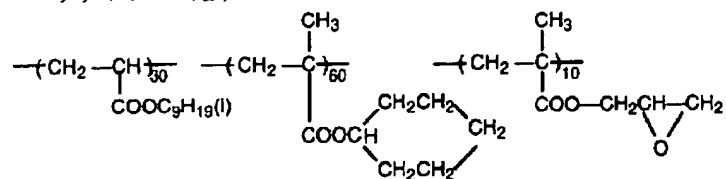
化合物 (S-1)



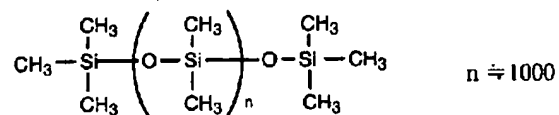
化合物 (S-2)



ラテックス (L)



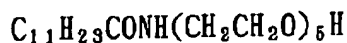
ポリシロキサン (S I)



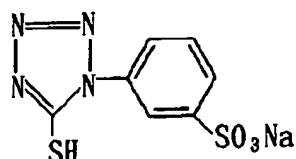
[0107]

[Formula 24]

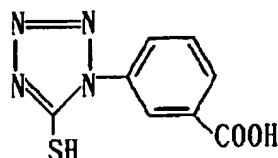
化合物 (O)



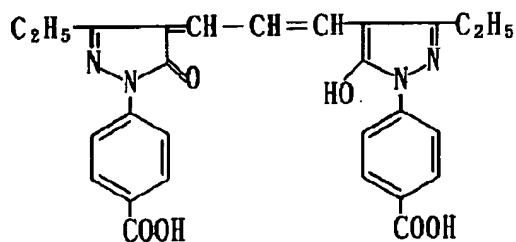
化合物 (M)



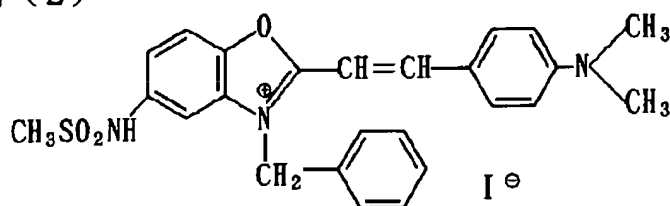
化合物 (N)



比較染料 (1)



比較染料 (2)



[0108] In addition, the adhesion volume of an additive is a part for one side, and the spreading silver content was adjusted so that it might be set to 1.6g/m² as a part for one side.

[0109] Thus, after saving each of obtained sample No.1-10 for four days under two kinds of preservation conditions (A:23 degrees C of conditions, 55%RH, B:40 degrees C of conditions, 80%RH), the photograph performance evaluation was performed.

[0110] [evaluation of the photograph engine performance] -- the sample profit **** sample was inserted by intensifying-screen--250 (Konica Corp. make) of two sheets, and through the aluminum wedge, tube voltage 80kvp, 100mA of tube electric currents, and the X-ray for 0.05 seconds were irradiated, and were exposed. subsequently, the object for quick processing -- it processed with the developer and fixer of the following formula using auto-processor SRX-502 (Konica Corp. make).

[0111] Density measurement of the sample [finishing / processing] was carried out by optical-density meter PDA-65 (Konica Corp. make), and sensibility, fogging, and remaining color nature were

evaluated. Sensibility took the inverse number of the light exposure in fogging concentration +0.5, and showed it by the relative value which set sensibility immediately after spreading desiccation of Table 1 of sample No.1 to 100. Remaining color nature processed the obtained sample in the unexposed state, and carried out visual evaluation. The best sample without a remaining color was set to 5, and the remaining color made 1 very bad level, and made it the level which can use four or more. Evaluation of MTF was performed as follows. That is, the MTF chart containing the square wave made from lead of 0.5-10 lines/mm was stuck at the rear face of the front-side of fluorescent screen--250 (Konica Corp. make), and after it irradiated the X-ray and the concentration of the part which is not covered with the chart of the lead of a film plane carried out the development so that it might become about 1.0 by both sides, the pattern of the recorded square wave was measured with M-cherry microdensitometer 5 mold (Konica Corp. make). The aperture size at this time was 300 micrometers in the direction of a square wave, and it was 25 micrometers in the direction of a right angle, and was 20 times the magnifying power of this. The with a spatial frequency [of 2.0 lines/mm] value showed MTF. The obtained result is shown in Table 1.

[0112] <Preparation of a processing agent> (developer formula)

Part-A (12l. finishing)

A potassium hydroxide 450g Potassium sulfite (50% water solution) 2280g GCC acid hydrogen sodium 132g Diethylene tetra-amine 5 acetic acid 120g 5-methyl benzotriazol 1.2g 1-phenyl-5-mercapto tetrazole 0.2g Hydroquinone 340g Water is added. Part-B to which 5000ml is made (12l. finishing)

A glacial acetic acid 170g Triethylene glycol 185g 1-phenyl-3-pyrazolidone 22g 5-nitroindazole 0.4g starter Glacial acetic acid 120g Potassium bromide 225g Water is added. Adding and agitating above-mentioned Part-A and above-mentioned Part-B at coincidence to 5l. of **** to which 1000ml is made, it adjusted to finishing with water and the glacial acetic acid adjusted pH to 12l. 10.4. Let this be a development replenisher. The 20ml of the aforementioned starters was added to 1l. of this development replenisher, pH was adjusted to 10.26, and it considered as the developer.

[0113] (Fixer formula)

Prat-A (18l. finishing)

Ammonium thiosulfate (70 wt/vol%) 6000g Sodium sulfite 110g Sodium acetate 3 monohydrate 450g Sodium citrate 50g Gluconic acid 70g 1 -(N and N-dimethylamino)- Ethyl-5-mercapto tetrazole 18g Prat-B (18l. finishing)

Aluminum sulfate (anhydrous salt conversion) Adding and agitating Part-A and Part-B to 5l. of 800g **** at coincidence, water was added, finishing, the sulfuric acid, and the sodium hydroxide were used for 18l., and pH was adjusted to 4.40.

[0114] The deed processing time performed processing in 45 seconds by dry to dry with 35 degrees C of development, 33 degrees C of fixing, 20 degrees C of rinsings, and 50 degrees C of desiccation, respectively.

[0115]

[Table 1]

試料 No.	染料		保存条件A				保存条件B			備考
	染料No.	塗布量(mg/m ²)	感度	カブリ	残色	MTF	感度	カブリ	残色	
1	なし		100	0.010	5	0.561	99	0.010	5	比較
2	比較染料(1)	35	68	0.016	3	0.55	64	0.020	2	比較
3	比較染料(2)	35	70	0.017	2	0.54	66	0.020	2	比較
4	1	35	95	0.010	5	0.63	95	0.010	5	本発明
5	3	35	94	0.011	5	0.63	94	0.011	5	本発明
6	8	35	95	0.011	5	0.63	94	0.011	5	本発明
7	10	35	93	0.011	5	0.63	93	0.011	5	本発明
8	14	35	95	0.011	5	0.63	94	0.011	5	本発明
9	15	35	94	0.010	4	0.62	94	0.011	4	本発明
10	16	35	95	0.011	5	0.63	95	0.011	5	本発明
11	22	35	94	0.012	5	0.62	94	0.012	5	本発明
12	27	35	93	0.012	4	0.63	93	0.012	4	本発明
13	29	35	93	0.012	4	0.62	93	0.012	4	本発明
14	33	35	95	0.011	5	0.62	94	0.012	5	本発明
15	35	35	92	0.012	5	0.62	92	0.012	5	本発明
16	44	35	95	0.012	4	0.63	94	0.012	4	本発明
17	45	35	94	0.011	5	0.61	94	0.012	4	本発明

[0116] Like [it is ***** from the result of Table 1, and], it is rare to have a bad influence on photograph properties, such as sensibility and fogging, and the photosensitive material containing the solid-state particle distribution object of the color of this invention is excellent in sharp nature, there is very little remaining color contamination after processing, and it turns out that it excels also in shelf life with the passage of time.

[0117] Like example 2 example 1, the coverage of the solid-state particle distribution object of the color by this invention was changed, and samples 18-31 were produced. The coverage of a color was shown in Table 2. After saving these samples for four days on condition that RH 23 degrees C / 55%, evaluation of sensibility, fogging, and remaining color nature was performed like the approach of example 1 publication. However, processing used the developer and fixer of example 1 publication, and was performed at 35 degrees C of development, 33 degrees C of fixing, 20 degrees C of rinsings, and 50 degrees C of desiccation, respectively, and dry to dry performed the processing time in 25 seconds. The obtained result is shown in Table 2.

[0118]

[Table 2]

試料 No.	染料		感度	カブリ	残色	備考
	染料No.	塗布量(mg/m ²)				
18	なし		100	0.011	5	比較
19	比較染料(1)	15	70	0.017	1	比較
20	比較染料(2)	15	71	0.017	1	比較
21	2	15	94	0.011	5	本発明
22	4	15	94	0.012	4	本発明
23	5	15	94	0.011	5	本発明
24	9	15	94	0.012	5	本発明
25	13	15	93	0.012	4	本発明
26	16	15	93	0.011	5	本発明
27	18	15	94	0.012	5	本発明
28	21	15	93	0.011	5	本発明
29	39	15	94	0.012	4	本発明
30	42	15	92	0.013	4	本発明
31	49	15	92	0.013	4	本発明

[0119] The photosensitive material which contains the solid-state particle distribution object of the color of this invention like [it is ***** and] from the result of Table 2 is understood that it is rare overly to have a bad influence on photograph properties, such as sensibility and fogging, also in quick processing, and there is very little remaining color contamination after processing.

[0120] it becomes 70 mol % and 30 mol [of silver bromides]% of example 3 (preparation of a silver halide emulsion) silver chlorides of silver halide presentation -- as -- the mixed water solution of a silver-nitrate water solution and NaCl, and KBr -- control DODABURUJUTTO -- it mixed by law and the silver halide particle was grown up. Under the present circumstances, mixing was performed under 36 degrees C and the conditions of pAg7.8 and pH3.0, and NaRhCl6 [2xten - seven mols / per one mol of silver] was added during particle formation. Following SD-3 [80mg / per one mol of silver] were added after mixed termination. It desalted by the conversion gelatin processed by phenyl isocyanate after that, and the germicide and ossein gelatin which consist of mixture of the following compound (A), (B), and (C) were added, and it re-distributed. The obtained emulsion was an emulsion which consists of a cube particle of the mean particle diameter of 0.2 micrometers, and 10% of coefficient of variation. Thus, it is 4-hydroxy-6-methyl per one mol of silver to the obtained emulsion. - 1, 3, 3a, and 60mg of 7-TETORAZA indenenes were added, 5mg [per one mol of silver] chloroauric acid and 0.5mg flower of sulfur were added further, and chemical ripening was performed for 60-degreeC and 80 minutes on condition that pH5.8 and pAg7.5. After [aging termination] 4-hydroxy-6-methyl - 1, 3, 3a, and 900mg per one mol of silver of 7-TETORAZA indenenes were added, and KI300mg and SD-4 350mg were added further.

[0121] (Preparation of silver halide photosensitive material) On one [which gave undercoat (example 1 reference of JP,59-19941,A) with a thickness of 0.1 micrometers to both sides] undercoat of a polyethylene terephthalate film with a thickness of 100 micrometers The anti HARESHON layer of the following formula (1) is painted so that the amount of gelatin may become 0.5 g/m². The silver halide emulsion layer of (2) was painted so that the amount of gelatin might become 2.6 g/m² and a silver content might become 3.2 g/m², and it painted so that the amount of gelatin might become 1.0 g/m² about the protective layer of the following formula (3) on it further. Moreover, on another undercoat of the opposite side, according to the following formula (4), the backing layer was painted so that the amount of gelatin might become 3.1 g/m², it painted so that the amount of gelatin might become 1.0 g/m² about the protective layer of the following formula (5) on it further, and the sample was created.

[0122]

Formula (1) [anti halation layer presentation]

Gelatin 0.5 g/m² Solid-state particle dispersing element color Amount given in Table 3 Surface active agent : [Sodium dodecylbenzenesulfonate] 5 mg/m² Colloidal silica (mean particle diameter of 0.014

micrometers) 18mg/m² Polyvinyl pyrrolidone (molecular weight 10,000) 35 mg/m² Hardening agent: HD The solid-state particle dispersing element of 25 mg/m² color was prepared like the approach of example 1 publication.

[0123]

Formula (2) [silver halide emulsion layer presentation]

Gelatin 2.6 g/m² Silver halide emulsion Silver content 3.2 g/m² Fogging inhibitor : [4-mercaptobenzoic acid] 2 mg/m² 5-nitroindazole 10 mg/m² Nucleating agent: Z-1 3xten - five mols/m² Nucleating accelerator : [Z-2] 1xten - four mols/m² Polymeric latex -1 1.0 g/m² Colloidal silica (mean particle diameter of 0.014 micrometers) 0.5 g/m² compound P 45mg/m² A water-soluble polymer : [V-1] 20 mg/m² Surfactant : [Saponin] 0.1 g/m² Sulfo sodium succinate Isopentyl normal DESHIRU ester 8mg/m² Hardening agent: 2-hydroxy - 4, 6-dichloro-1,3,5-triazine 60 mg/m² formula (3) [emulsion protective layer presentation]

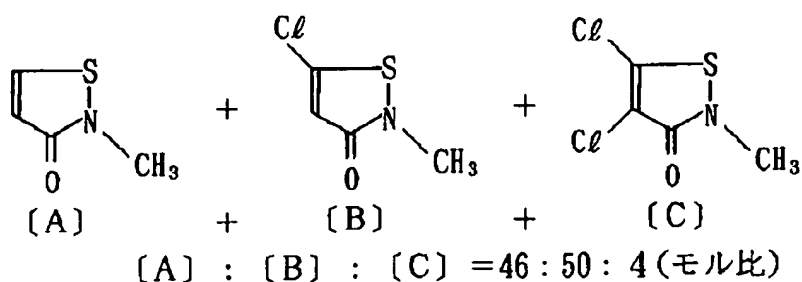
Gelatin 1.0 g/m² Mat agent : [A silica with a mean particle diameter of 3.5 micrometers] 20mg/m² Polymeric latex 2 0.5 g/m² Surfactant : [Sulfo sodium succinate] Di(2-ethylhexyl) ester 10 mg/m² Surfactant F-1 2 mg/m² Accelerator : [Hydroquinone] 50 mg/m² 1-phenyl-4-hydroxymethyl -4'-methyl-3-pyrazolidone 5 mg/m² Hardening agent: HD 30 mg/m² formula (4) [backing layer presentation]

A color (D-1) 50 mg/m² Color (D-2) 40 mg/m² Color (D-3) 30mg/m² Gelatin 3.1 g/m² Surface active agent : [Sodium dodecylbenzenesulfonate] 50 mg/m² 1-phenyl-5-mercapto tetrazole 5 mg/m² Colloidal silica 0.4 g/m² Hardening agent: HD 60 mg/m² formula (5) [backing protective layer presentation]

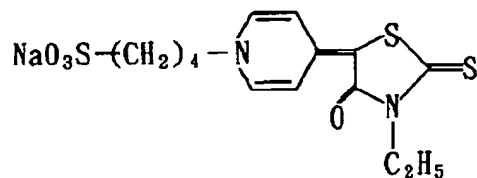
Gelatin 1g/m² Mat agent : [Polymethylmethacrylate of 4.0 micrometers of mean diameters] 50 mg/m² Surfactant : [Sulfo sodium succinate] Di(2-ethylhexyl) ester 10mg/m² Hardening agent : [HD] 25 mg/m² 2-hydroxy - 4, 6-dichloro-1,3,5-triazine Each compound used 25 mg/m² is shown below.

[0124]

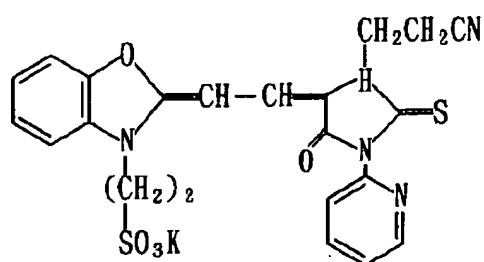
[Formula 25]



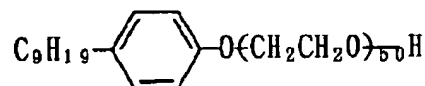
SD-3



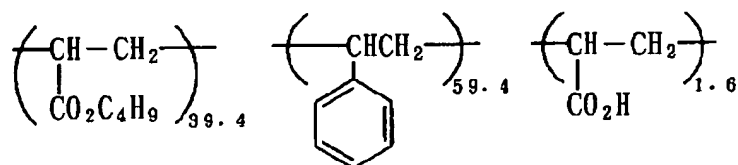
SD-4



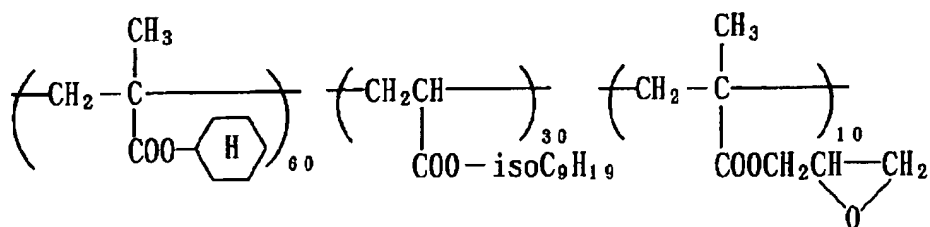
化合物 P



ポリマーラテックス 1



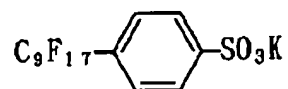
ポリマーラテックス 2



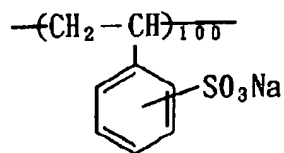
[0125]

[Formula 26]

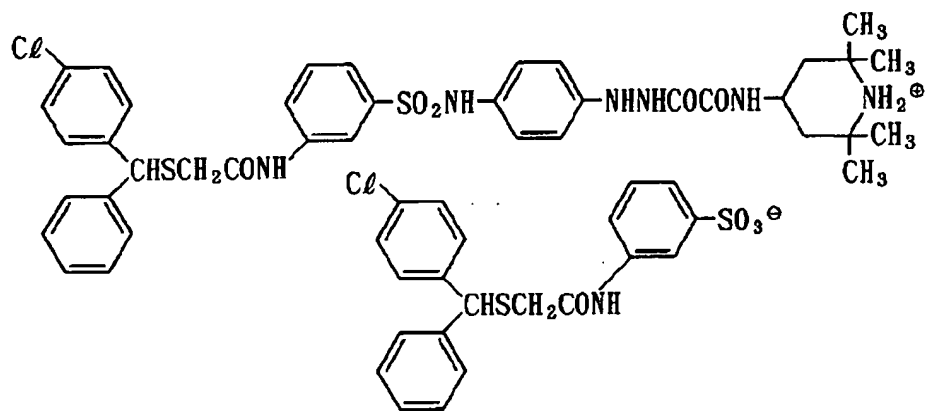
F - 1



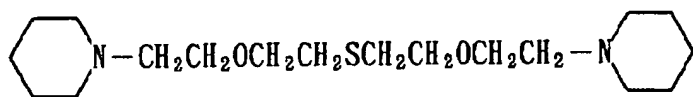
V - 1



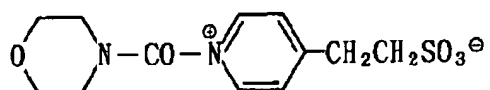
Z - 1



Z - 2



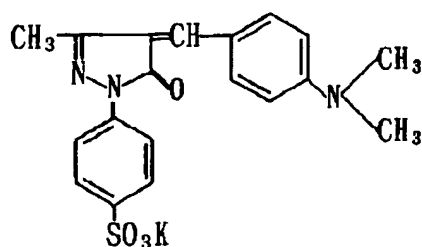
H D



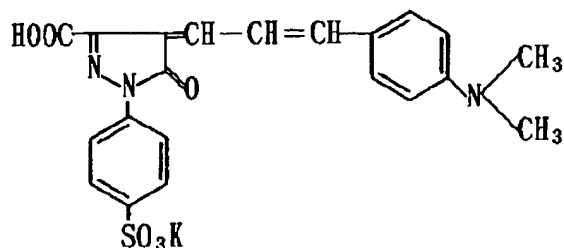
[0126]

[Formula 27]

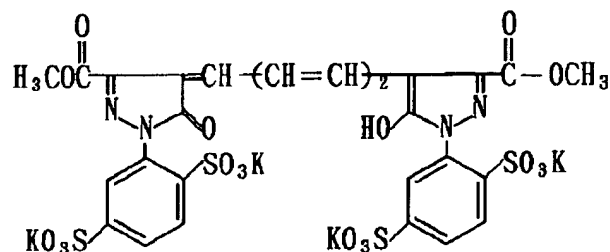
D - 1



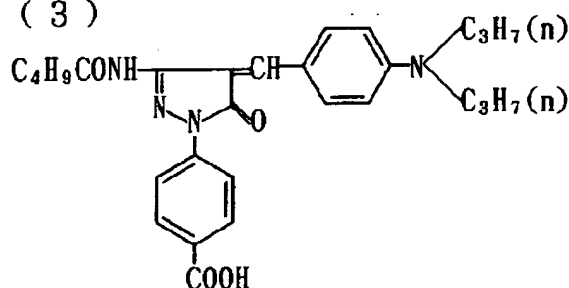
D - 2



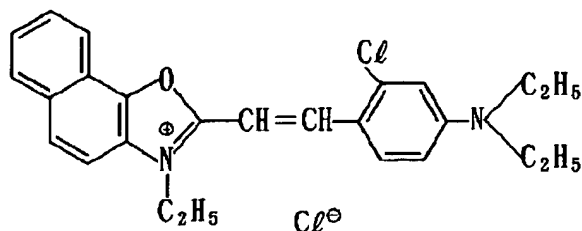
D - 3



比較染料 (3)



比較染料 (4)



[0127] The following approach estimated the obtained sample.

[0128] [Sensibility and gamma] The obtained sample was stuck to the step wedge, it exposed for 3 seconds with 3200-degree K tungsten light, development fixing processing was performed, and it asked for sensibility. In addition, sensibility was the inverse number of the light exposure which gives fogging concentration +3.0 transmission density, set sensibility of sample No.1 to 100, and asked for it by the relative value in each condition. Moreover, it asked for gamma from the inclination of the characteristic curve in transmission density 1.0-3.0. Ten or more are required for gamma practically.

[0129] [Halftone dot quality] A part of return network screen (150 lines / inch) of 50% of halftone dot area was given to the step wedge, the sample was stuck to this, exposure was given for 5 seconds by the xenon light source, the following development was performed, visual observation of the halftone dot quality of a sample was carried out with the 100 times as many magnifier as this, the best sample of halftone dot quality was set to 5, 1 was made into very bad level, and it considered as the level which can use four or more.

[0130] [Remaining color] The obtained sample was processed in the unexposed state and five sheets carried out visual evaluation in piles. The best sample with few remaining colors was set to 5, and the remaining color made 1 very bad level, and made it the level which can use four or more.

[0131] The obtained result is shown in Table 3.

[0132] It processed on the following conditions with the quick auto-processor by the developer of the presentation shown below, and the fixer.

[0133] Developer formula (presentation A)

Pure water (ion exchange water) 150ml Disodium ethylenediaminetetraacetate 2g Diethylene glycol 50g Potassium sulfite (55%W/V water solution) 100ml Potassium carbonate 50g Hydroquinone 15g 5-methyl benzotriazol 200mg 1-phenyl-5-mercapto tetrazole 30mg Potassium bromide 4.5g Potassium hydroxide Amount which sets pH of a used solution to 10.4 (presentation B)

Pure water (ion exchange water) 3ml Diethylene glycol 50g Disodium ethylenediaminetetraacetate 25mg Acetic acid (90% water solution) 0.3ml 5-nitroindazole 110mg 1-phenyl-3-pyrazolidone It dissolved in order of the above-mentioned presentation A and presentation B into 500ml of water at the time of use of 500mg developer, and finished and used for 1l.

[0134] Fixer formula (presentation A)

Ammonium thiosulfate (72.5%W/V water solution) 240ml Sodium sulfite 17g Sodium acetate and 3 monohydrate 6.5g A sodium citrate and 2 monohydrate 2g Boric acid 6g Acetic acid (90% water solution) 13.6ml (presentation B)

Pure water (ion exchange water) 17ml Sulfuric acid (50%W/V water solution) 4.7g Aluminum sulfate (an aluminum₂O₃ conversion content is 8.1%W/V water solution) It dissolved in order of the above-mentioned presentation A and the presentation B into 500ml of water at the time of use of 26.5g fixer, and finished and used for 1l. pH of this fixer was about 4.3.

[0135] Development conditions (process) (temperature) (time amount)

Development 35 degrees C 30-second fixing 33 degrees C 20-second rinsing Ordinary temperature 15-second desiccation 45 degrees C 15 seconds [0136]

[Table 3]

試料 No.	染料		感度	カブリ	ガンマ	網点品質	残色	備考
	染料No.	塗布量(mg/m ²)						
32	なし		100	0.012	15	2	5	比較
33	比較染料(3)	90	85	0.018	16	3	1	比較
34	比較染料(4)	90	81	0.020	14	3	2	比較
35	1	90	94	0.012	17	5	5	本発明
36	2	90	93	0.012	16	5	5	本発明
37	5	90	94	0.013	16	5	5	本発明
38	8	90	94	0.012	16	5	5	本発明
39	9	90	93	0.013	16	4	5	本発明
40	13	90	93	0.014	15	5	5	本発明
41	15	90	92	0.013	16	4	5	本発明
42	16	90	94	0.012	16	5	5	本発明
43	17	90	93	0.012	17	5	4	本発明
44	20	90	93	0.014	16	4	5	本発明
45	24	90	94	0.013	16	5	4	本発明
46	30	90	94	0.012	15	5	4	本発明
47	36	90	93	0.013	16	5	5	本発明
48	41	90	93	0.014	14	4	5	本発明
49	44	90	94	0.013	16	5	5	本発明
50	46	90	93	0.014	16	4	4	本発明
51	48	90	93	0.013	17	5	4	本発明

[0137] Like [it is ***** from the result of Table 3, and], the photosensitive material containing the solid-state particle dispersing element of the color of this invention has having [little] a bad influence on photograph properties, such as sensibility and fogging, it excels in halftone dot quality, and it turns out [of the remaining color contamination after a development] that it is very few.

[0138] The silver chloride 70 mol % remainder adjusted the chloro-bromide emulsion which consists of a silver bromide using example 4 (adjustment of silver halide emulsion A) coincidence alligation.

8.1xten - eight mol per one mol of silver of K₃RhBr(s)₆ were added at the time of coincidence mixing. The obtained emulsions were a cube with a mean particle diameter of 0.20 micrometers and an emulsion of a monodisperse particle (9% of coefficient of variation). Subsequently, the emulsion was desalted to JP,2-280139,A by the derivatized gelatin (it is what permuted the amino group in gelatin by phenyl carbamyl, for example, is instantiation G-8 of JP,2-280139,A) of a publication. EAg after demineralization was 190mV at 50 degrees C.

[0139] After adjusting the obtained emulsion to pH5.58 and EAg123mV, it was made the temperature of 60 degrees C, and it gave one mol of silver, and was, 2.2xten - five mols of chloroauric acid were added, S8 [2.9xten - six mols / per one mol of silver] was added after churning for 2 minutes, and chemical ripening for 78 more minutes was performed.

[0140] 4-hydroxy-6-methyl - 3.5xten - four mols and 28.4g of gelatin were added for 7.5xten - three mols, and 1-phenyl-5-mercapto tetrazole, and 1, 3, 3a, and 7-TETORAZA indene were used as emulsion liquid.

[0141] (Preparation of silver halide photosensitive material) The anti halation layer of the following formula 1 was applied on one [which carried out antistatic finish of a publication to the example 3] under coat of a polyethylene terephthalate film with a thickness of 100 micrometers. Besides, the silver content applied the silver halide emulsion of the following formula 2 to the layer so that 3.3 g/m² and the amount of gelatin might become at 1.7 g/m².

[0142] Furthermore, as a protective layer, the coating liquid of the following formula 3 was applied to the upper layer so that the amount of gelatin might become 0.8g/m². Moreover, on the under coat of the opposite side, the backing layer of the following formula 4 was applied so that the amount of gelatin might be set to 1.5g/m², it applied so that gelatin might become 1 g/m² in the upper layer about the

protective layer of the following formula 5 further, and the sample shown in Table 4 was created.

[0143]

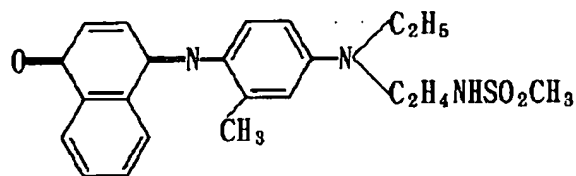
Formula 1 (anti halation layer presentation)

Gelatin 0.4 g/m² Solid-state particle dispersing element color Amount given in Table 4 Alkanol - XC (Du Pont make) N and N'-methylenebis 3.5 mg/m² (beta- (vinyl sulfonyl)) Colloidal silica (mean particle diameter of 0.014 micrometers) 10 mg/m²

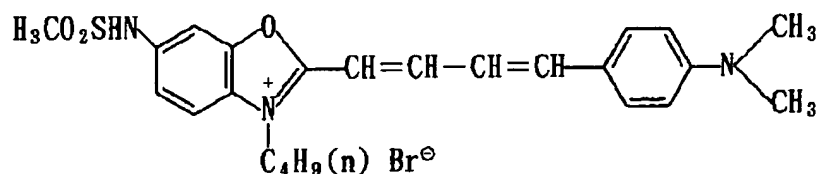
Propione amide 25 mg/m² [0144]

[Formula 28]

比較染料 (5)



比較染料 (6)

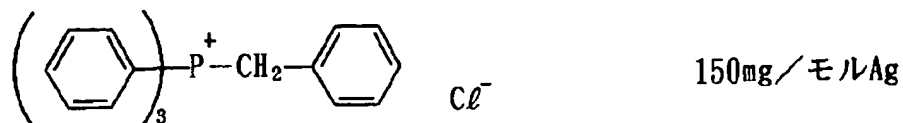
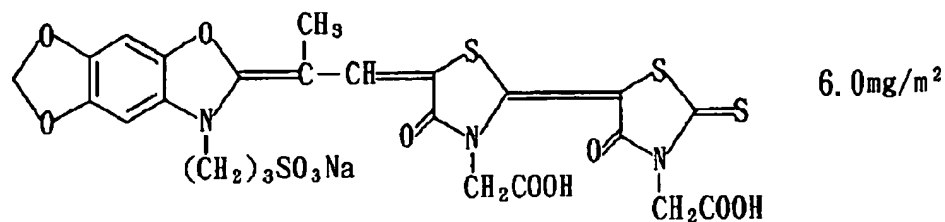


[0145] Formula 2 (silver halide emulsion layer presentation)

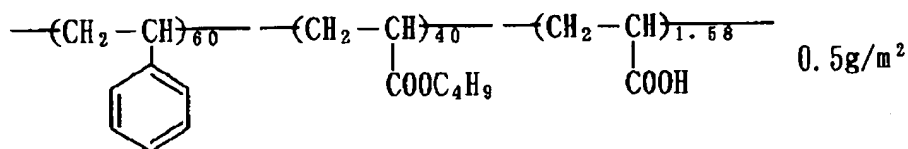
[0146]

[Formula 29]

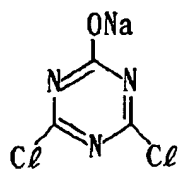
増感色素



ラテックスポリマー



硬膜剤



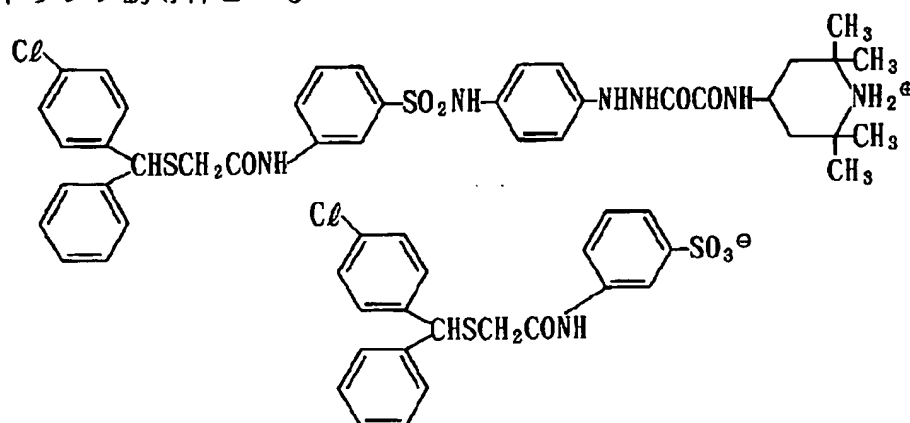
HCHO

30mg/m²

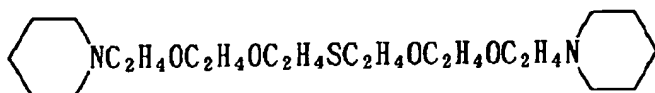
[0147]

[Formula 30]

ヒドラジン誘導体 Z-3

 2×10^{-4} モル/モル Ag

造核促進剤 Z-4

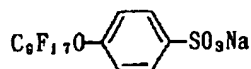
 1×10^{-3} モル/モル Ag

[0148]

The sulfo sodium succinate iso-amyl-n-DESHIRU ester 0.64 mg/m² 2-mercapto-6-hydroxy pudding 1.7 g/m² EDTA 50 mg/m² Hydroquinone 50 mg/m² formula 3 (emulsion protective layer presentation)
Sulfo sodium succinate iso-amyl-n-DESHIRU ester 12 mg/m² Mat agent: Mono dispersion silica of mean-particle-diameter 3.5micro m 22 mg/m² 1, 3-vinyl sulfonyl-2-propanol 40 mg/m² [0149]

[Formula 31]

界面活性剤

0.6mg/m²

[0150] In addition, each coating liquid by the side of an emulsion adjusted the film surface pH to 5.5 by sodium acetate.

[0151]

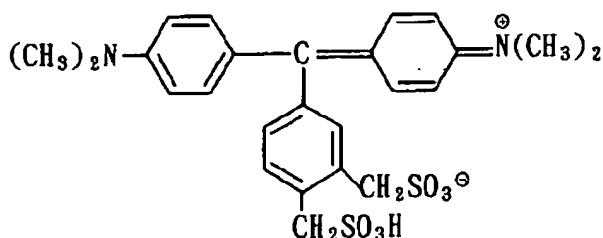
Formula 4 (backing layer presentation)

Saponin 133 mg/m² Sulfo sodium succinate iso-amyl-n-DESHIRU ester 6 mg/m² Colloidal silica (mean particle diameter of 0.014 micrometers) 100 mg/m² [0152]

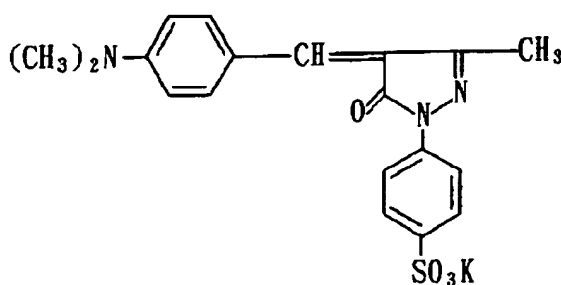
[Formula 32]

染料

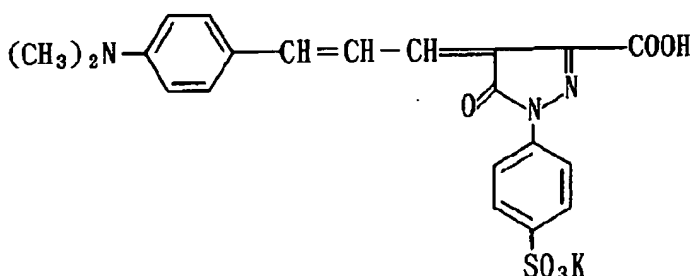
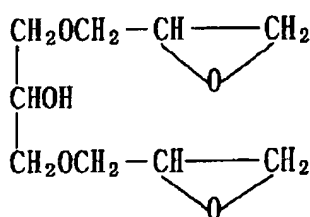
(a)

30mg/m²

(b)

75mg/m²

(c)

30mg/m²100mg/m²

[0153]

Formula 5 (backing protective layer presentation)

Mat agent: 5.0 micrometers [of mean diameters] mono dispersion polymethylmethacrylate 50mg/m²
 Sulfo sodium succinate Di(2-ethylhexyl) ester After sticking the sample obtained 10 mg/m² with the
 step wedge and performing exposure with a wavelength of 633nm as a substitution property of helium-
 Ne laser light, it processed on the following conditions using the developer and fixer of the following
 presentation with the auto-processor for quick processing (GR-26SR Konica Corp. make).

[0154]

(Developer formula)

A sodium sulfite 55g/l. Potassium carbonate 40g/l. Hydroquinone 24g/l. 4-methyl-4-hydroxymethyl-1-
 phenyl -3-hydrazo RIDON (JIMEZONS) 0.9g/l. Potassium bromide 5g/l. 5-methyl-benzotriazol 0.13g/l.
 Way acid 2.2g/l. Diethylene glycol 40g/l. 6-propyl-2-thiouracil 60mg [l.] water and a potassium
 hydroxide are added, and it is made 1l. / pH10.4.

[0155] (Fixer formula)

((A) Presentation)

Ammonium thiosulfate (72.5%W/V water solution) 240ml Sodium sulfite 17g Sodium acetate and 3 monohydrate 6.5g Boric acid 6.0g A sodium citrate and 2 monohydrate 2.0g (presentation B)

Pure water (ion exchange water) 17ml Sulfuric acid (water solution of 50%W/V) 4.7g Aluminum sulfate (an aluminum₂O₃ conversion content is the water solution of 8.1%W/V) It melted in order of the above-mentioned presentation A and the presentation B in 500ml of water at the time of use of 26.5g fixer, and finished and used for 1l. The acetic acid adjusted pH of this fixer to 4.8.

[0156] (Development conditions)

(Process) (temperature) (time amount)

Development 35 degrees C 25-second fixing 33 degrees C 17-second rinsing Ordinary temperature 15-second desiccation 40 degrees C The result obtained for 30 seconds is shown in the following table 4.

[0157]

[Table 4]

試料 No.	染料		感度	カブリ	ガンマ	網点品質	残色	備考
	染料No.	塗布量(mg/m ²)						
52	なし		100	0.012	15	2	5	比較
53	比較染料(5)	90	73	0.018	12	2	1	比較
54	比較染料(6)	90	81	0.020	11	3	2	比較
55	4	90	93	0.013	15	5	5	本発明
56	11	90	92	0.013	14	4	5	本発明
57	12	90	93	0.014	15	5	4	本発明
58	20	90	91	0.014	15	5	5	本発明
59	23	90	92	0.013	14	5	5	本発明
60	25	90	93	0.015	13	4	5	本発明
61	26	90	93	0.016	14	4	5	本発明
62	31	90	92	0.013	14	4	4	本発明
63	32	90	91	0.014	15	5	4	本発明
64	237	90	92	0.015	14	5	5	本発明
65	38	90	91	0.013	13	4	4	本発明
66	43	90	92	0.014	12	5	4	本発明
67	46	90	91	0.015	13	4	5	本発明
68	50	90	91	0.014	14	4	4	本発明

[0158] The photosensitive material which contains the solid-state particle dispersing element of the color of this invention so that clearly from the result of Table 4 has having [little] a bad influence on photograph properties, such as sensibility and fogging, is excellent in halftone dot quality, and is understood that there is very little remaining color contamination after a development.

[0159] Moreover, when each sample of above-mentioned this invention was similarly processed on the following development conditions, it was good at sensibility, fogging, and the remaining color nature point.

[0160]

(Process) (temperature) (time amount)

Development 35 degrees C 15-second fixing 33 degrees C 10-second rinsing Ordinary temperature 8-second desiccation 50 degrees C 10 seconds [0161]

[Effect of the Invention] The photosensitive material containing the solid-state particle dispersing element of the color of this invention has having [little] a bad influence on photograph properties, such as sensibility and fogging, and there is very little remaining color contamination after a development.

[Translation done.]